CJCSM 6231.01B
17 November 2000

MANUAL FOR EMPLOYING JOINT TACTICAL COMMUNICATIONS

JOINT SYSTEMS MANAGEMENT

JOINT STAFF
WASHINGTON, D.C. 20318

CHAIRMAN OF THE JOINT CHIEFS OF STAFF MANUAL

J-6 CJCSM 6231.01B
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MANUAL FOR EMPLOYING JOINT TACTICAL COMMUNICATIONS
JOINT SYSTEMS MANAGEMENT

References: See Enclosure D

1. Purpose. CJCSM 6231.01B sets the framework for developing the CJCSM 6231 series. It addresses the generic communications network required to support a joint task force (JTF) or joint special operations task force (JSOTF). It identifies communications concepts and provides guidance for planning and employing joint single channel and multichannel networks that use TRI-TAC, ground mobile forces (GMF), and selected Service-unique equipment. The specific purposes of this manual are to:

a. Provide a basis for preparing communications plans and orders to support joint operations or exercises.

b. Establish standards and procedures for planning, engineering, installing, operating, and managing switching and transmission systems used to support the secure voice and data networks essential to the successful employment of US joint forces worldwide.

c. Provide planning guidance and procedures to the CINCs, JTFs, or CINC-directed equivalent commanders, and Service component commanders in planning, installing, operating, and maintaining joint communications systems.

d. Serve as a reference point for developing Service-unique systems or application manuals.

2. Cancellation. CJCSM 6231.01A, 23 May 1997, "Manual for Employing Joint Tactical Communications Systems--Joint Systems Management," is canceled.

3. Applicability. This manual applies to:

a. The combatant command or JTF J-6 directorate (or equivalent office) responsible for joint communications management in a deployed JTF.

b. Components and the assigned joint communications support organization in a JTF.

4. Summary of Changes

a. Information about the Global Information Grid was added.

b. The appendix on near- and mid-term Services' tactical communications architectures was updated.

c. The architecture for the Joint Communications Support Element was added.

d. Information about information operations was deleted.

e. Information about the Theater C4 Coordination Center was added.

5. Releasability. This manual is approved for public release; distribution is unlimited. DOD components (to include the combatant commands), other federal agencies, and the public may obtain copies of this manual through the Internet from the CJCS Directives Home Page--http://www.dtic.mil/doctrine/jel/cjcsd/cjcsm.htm. Copies are also available through the Government Printing Office on the Joint Electronic Library CD-ROM.

6. Effective Date. This manual is effective upon receipt.

S. A. FRY
Vice Admiral, U.S. Navy
Director, Joint Staff

Enclosures:

A - Introduction
B - Joint Communications Concepts and Responsibilities
C - Joint Communications Management
D - References
E - Compact Disk Distribution List
GL - Glossary

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LIST OF EFFECTIVE PAGES

The following is a list of effective pages for CJCSM 6231.01B. Use this list to verify the currency and completeness of the document. An "O" indicates a page in the original document.

PAGE	CHANGE	PAGE	CHANGE
1 thru 4	O	B-A-C-1 thru B-A-C-4	O
i thru viii	O	B-A-D-1 thru B-A-D-4	O
A-1 thru A-4	O	B-A-E-1 thru B-A-E-10	O
A-A-1 thru A-A-6	O	C-1 thru C-8	O
B-1 thru B-12	O	D-1 thru D-2	O
B-A-1 thru B-A-2	O	E-1 thru E-10	O
B-A-A-1 thru B-A-A-8	O	GL-1 thru GL-10	O
B-A-B-1 thru B-A-B-14	O		

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RECORD OF CHANGES

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ENCLOSURE A

INTRODUCTION

1. General. This volume provides an introduction to CJCSM 6231 (.01 through .07). It identifies in general terms joint communications concepts and responsibilities and planning information for employing joint single channel and multichannel networks that use TRI-TAC, GMF, and selected Service-unique equipment. A manual tree is depicted in Figure A-1.

2. Purpose. The primary purposes of this manual are to:

a. Provide a basis for preparing communications plans and orders to support joint operations or exercises.

b. Establish standards and procedures for installing, operating, and maintaining joint communications systems.

c. Provide planning guidance and procedures to the CINCs, JTFs, or CINC-directed equivalent commanders, and Service component commanders in planning, managing, and installation, operation, and maintenance (IOM) of joint communications systems.

d. Serve as a reference point for developing Service-unique systems or application manuals.

3. Scope. Volume 1, CJCSM 6231.01B, introduces CJCSM 6231, establishes the charter for the group that configuration manages 6231 changes, presents a conceptual model of the joint network and system to include joint communications concepts, shows future Service plans, and discusses the organization and responsibilities of the Joint Communications Control Center (JCCC).

a. Enclosure A provides an introduction; purpose, scope, and authority; and how changes are managed.

b. Appendix to Enclosure A is the Charter for the Joint Tactical Communications Systems Manual Working Group.

c. Enclosure B provides a conceptual model of the joint network and discusses joint command and control (C2) communications concepts and organizational responsibilities.

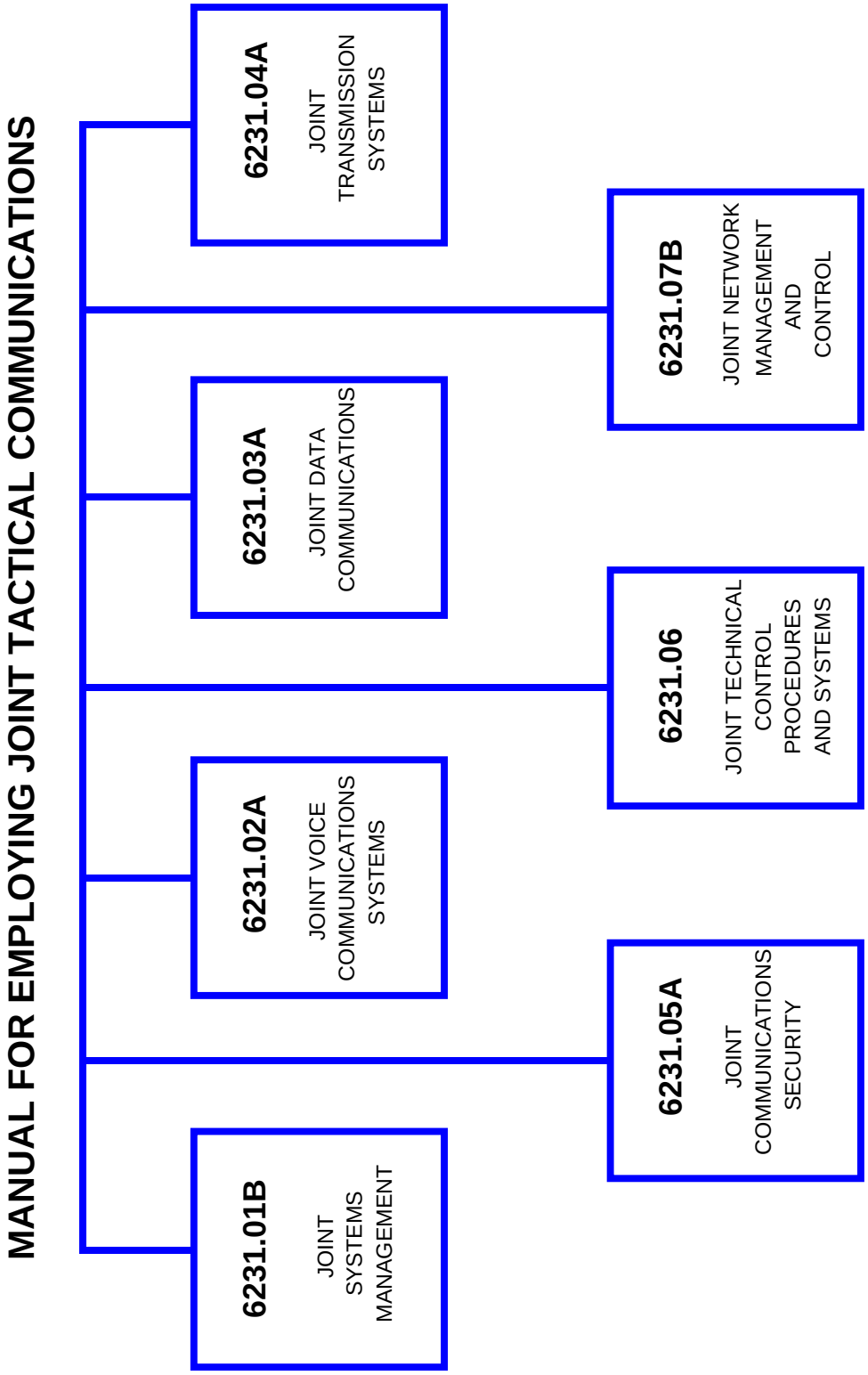

Figure A-1. CJCSM 6231 Manual

d. Appendix to Enclosure B provides an insight into future updates of CJCSM 6231, based on the Services' near-and mid-term tactical communications architectures. Brief summaries of these architectures are enclosed as annexes.

e. Enclosure C is an introduction to joint communications management. It describes deployed joint communications structure management and JCCC structure and responsibilities.

f. Enclosure D lists related references.

g. Enclosure E contains a distribution list for CJCSM 6231 on CD-ROM.

h. The Glossary lists abbreviations and acronyms used in CJCSM 6231.01B.

4. Authority. MJCS 239-86 established the JCS Systems Manual Joint Working Group (JWG) and formally charged it with the responsibility to provide the continuing updates, operational guidance, and validation of technical procedures necessary to maintain Joint Pub 6-05 (now CJCSM 6231). MJCS 61-87 made DISA Joint Information and Engineering Organization (JIEO) (formerly Joint Tactical Command, Control, and Communications Agency (JTC3A)) responsible, through the JWG, for maintaining CJCSM 6231 (formerly Joint Pub 6-05). The Director, JTC3A, approved the JWG Charter on 11 June 1991. Signature authority for the charter was delegated to the Director, JTC3A, from the Joint Staff.

5. Changes to CJCSM 6231. A combatant command, Service, or agency; the Joint Communications Support Element (JCSE); or the Joint Staff may submit user change proposals to CJCSM 6231. The appropriate combatant command, Service, agency, or Joint Staff office of primary responsibility (OPR) forwards change proposals to the JWG Chairman (JIEO) for processing. See Appendix to Enclosure A, paragraph 5, for a description of the process for submitting changes.

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APPENDIX TO ENCLOSURE A

CHARTER FOR THE JOINT TACTICAL COMMUNICATIONS SYSTEMS MANUAL WORKING GROUP

1. Purpose. The Joint Tactical Communications Systems Manual Working Group (JTCSMWG), formerly called the JWG, is hereby established to provide a means of controlling and evaluating changes to the Joint Tactical Communications Systems Manual (JTCSM) designated as CJCS Manual (CJCSM) 6231. CJCSM 6231 addresses the joint communications networks required to support deployed JTFs or JSOTFs as well as Service component networks. It identifies communications concepts and provides operational guidance for planning and employing joint single channel and multichannel networks that use TRI-TAC, GMF, and selected Service-unique equipment. The JTCSMWG is the forum for providing proposed changes and configuration management to CJCSM 6231 and associated related joint tactical communications procedures. The JTCSMWG will ensure CJCSM 6231 accurately reflects current and planned joint tactical communications networks.

2. Authority. The JTCSMWG is a formal body chartered by the Director, Joint Staff. Responsibility for the administration of the JTCSMWG is assigned to JIEO. The voting members of the JTCSMWG are responsible for providing continual updates of operational guidance and technical procedures.

3. Membership. The JTCSMWG will be chaired by JIEO and will consist of one representative from each of the following organizations. A simple majority of these members will constitute a quorum for all JTCSMWG meetings.

a. Voting Member Organizations

(1) Commander in Chief, US Central Command (CCJ6-CE).

(2) Commander in Chief, US Special Operations Command (SOJ6-I).

(3) Commander in Chief, US Joint Forces Command (J641).

(4) Commander in Chief, US Southern Command (SCJ6-O).

(5) US Commander in Chief, Europe (ECJ6-O).

(6) Commander in Chief, US Pacific Command (J6224).

(7) The Joint Staff (J6T).

(8) Headquarters, Department of the Army (DISC4, SAIS-PAC-N).

(9) Headquarters, US Air Force (HQ AFCIC/SYOT).

(10) Chief of Naval Operations (CNO N61C2).

(11) Commandant of the Marine Corps (MCCDC C42).

(12) Defense Information Systems Agency (D333).

(13) National Security Agency (Y271).

(14) Joint Communications Support Element (JCSE-J5).

(15) Joint Interoperability Test Command (JTEB).

b. Associate Members

(1) Commander in Chief, US Strategic Command (J6).

(2) Commander in Chief, US Transportation Command (TCJ6).

(3) Commander in Chief, US Space Command (SPJ6).

(4) Joint COMSEC Management Office (JCMO).

(5) Defense Intelligence Agency (DSO-2).

4. Responsibilities

a. The JTCSMWG will:

(1) Meet at least semiannually or more often when deemed necessary by the Chairman.

(2) Act as the formal configuration management body for the JTCSM and manage the content of the manual.

(3) Identify CINC/Service/Defense agency (C/S/A) joint interoperability procedures and interface requirements that need to be addressed in the JTCSM.

(4) Propose configuration changes to the manual and review all input and change proposals to the manual. All subordinate organizations submitting comments or changes will use the chain of command through the voting member representing their interests. Changes submitted directly to the Chair will be considered for information only until validated by the appropriate voting member. Proposed changes must be in the format prescribed in Section 5.

(5) Service headquarters representatives will ensure the manual is entered into their respective Service publication distribution systems.

b. The JTCSMWG Chair will:

(1) Announce, arrange, conduct, and document JTCSMWG meetings. Closed sessions for JTCSMWG voting members only may be invoked by the Chair to discuss classified/contractor-sensitive information, or if requested by a voting member.

(2) Administer the publication production and convene and chair the Technical Sub Working Group (TSWG) meetings, as required, to resolve technical issues arising during an update cycle.

(3) Maintain a current listing of all JTCSMWG voting members and alternates.

(4) Maintain a current distribution list of all organizations receiving the manual.

(5) Document and distribute the results and action items of each meeting in a set of minutes.

(6) Coordinate and track all action items through final resolution by the JTCSMWG.

(7) Review all proposed inputs to the manual for appropriateness, applicability, and presentation to the JTCSMWG.

(8) Periodically develop draft and final updates to each JTCSM volume by securing funding and manpower to adequately accomplish the task.

(9) Locate at Ft. Monmouth, NJ, to maintain close proximity to, and working relationships with, other organizations dealing with the development of tactical switched systems and the issues relating to those systems.

(10) Vote on JTCSMWG issues in the case of a tie.

c. The Joint Staff will:

(1) Review drafts for format.

(2) Execute a joint action on each volume of the manual.

(3) Publish and distribute the manual in accordance with the distribution list indicated in the covering memo, in hard copy, or post to the Joint Electronic Library.

d. JTCSMWG voting members will:

(1) Have full authority to represent their respective organizations and to vote on its behalf.

(2) Provide an alternate, as appropriate, who will represent the organization in the absence of the primary representative.

(3) Provide concurrence and or appropriate comments on all drafts submitted by the Chairman.

(4) Provide technical inputs to TSWG and JTCSMWG meetings and requests for information, as appropriate.

e. The associate members may:

(1) Attend selected meetings at their discretion.

(2) Comment on topics and submit proposals for changes relating to their specific area of interest.

(3) Vote on issues that, in their view, may impact on their area of interest.

5. Change Proposal Format. The format for comments or change to draft volumes will consist of the following:

a. CJCSM 6231 volume number, title.

b. Volume page, paragraph.

c. Submitting organization.

d. Source.

e. Change objectives.

f. Technical details.

g. Diagrams, if necessary.

h. Test data, if necessary.

i. Originator Point of Contact.

6. Update Approval Process. Each volume will be reviewed at least once in a 2-year cycle. If a volume requires major revisions due to changes in equipment, technology, or tactics, it will be scheduled for an update. The JTCSMWG Chair or any member can request a review and update of any volume. When the first draft is complete, it will be distributed to the voting membership (the designated C/S/A and their subordinate organizations), with a 60-day minimum suspense. After comments are received and incorporated, a second draft will be distributed to the voting membership and their subordinate organizations, with a 30-day minimum suspense. Concurrent with distribution of the second draft, the Joint Staff voting member (J6T) will forward the draft to the Editorial

and Action Processing Branch, Joint Secretariat, for editorial review. To ensure that the update is valid and to ensure its continuing participation in the update process, all voting members must either provide additional comments or indicate approval as written. To that end, communication must be received from all voting members. This is especially critical for CINC and Defense agency voting members because they are not involved, by choice, in the final coordination process which is limited to the Services. When editing is complete and corrections made, the Joint Staff voting member (J6T) will initiate a joint action, with a 30-day suspense. The Service Planners (O-6 level) will, after consulting with their JTCSMWG Service voting member, indicate their agreement. The updated volume will then go forward to Actions Division for final Joint Staff processing and signature by the Director, Joint Staff.

7. Organizational Structure. The JTCSMWG is the basic organizational structure. There will be TSWGs formed for the purpose of developing revisions to volumes, convened at the discretion of the CJCSM 6231 JTCSMWG Chair.

8. Approval, Amendments, and Modifications. The charter will be examined for update biennially. Amendments or modifications to this charter will be submitted through the appropriate voting member for approval in accordance with this section.

ENCLOSURE B

JOINT COMMUNICATIONS CONCEPTS AND RESPONSIBILITIES

1. General. CJCSM 6231 bases its conceptual model of the joint network on a JTF, capable of rapidly deploying and employing designated forces in response to worldwide contingencies in an underdeveloped operational or theater area. This manual is not intended to circumvent existing treaty agreements in NATO, Korea, Japan, or any other country having a treaty or agreement with the United States. It assumes that a deployed JTF (its headquarters, component forces, and supporting elements) requires responsive secure and nonsecure communications systems to ensure positive C2 during each critical phase of contingency operations. Employment of a full JTF for extended periods, in a bare-base environment, requires deployment of a full range of communications and automatic data processing (ADP) systems to ensure that the commander joint task force (CJTF) and staff can effectively control assigned forces. Figure B-1 shows a generic JTF with its component structure.

2. Joint Command and Control Communications Concepts

a. Joint Communications Systems

(1) Figure B-2 depicts the generic C4 joint system that links the supported CINC (as required) to the JTF, the joint special operations task force (JSOTF), the deployed Service components, and Defense Information Systems Network (DISN). Connectivity is through a combination of satellite links, terrestrial multichannel links, fiber optic cables, postal telephone and telegraph (PTT), and high frequency (HF) radio links. These communications links support record and data switching, voice switching, facsimile services, teleport and video teleconferencing (VTC), and special purpose circuits (such as a sensitive compartmented information (SCI) local area network (LAN) and an interswitch trunk to the Defense Red Switch Network (DRSN)). CJCSMs 6231.02A through .07B discuss characteristics of these networks and transmission systems.

(2) The JTF HQ and Service components use ultra high frequency (UHF), super high frequency (SHF), extremely high frequency (EHF), and commercial satellite terminals as the primary means to support headquarters connectivity. UHF and SHF satellite terminals are provided

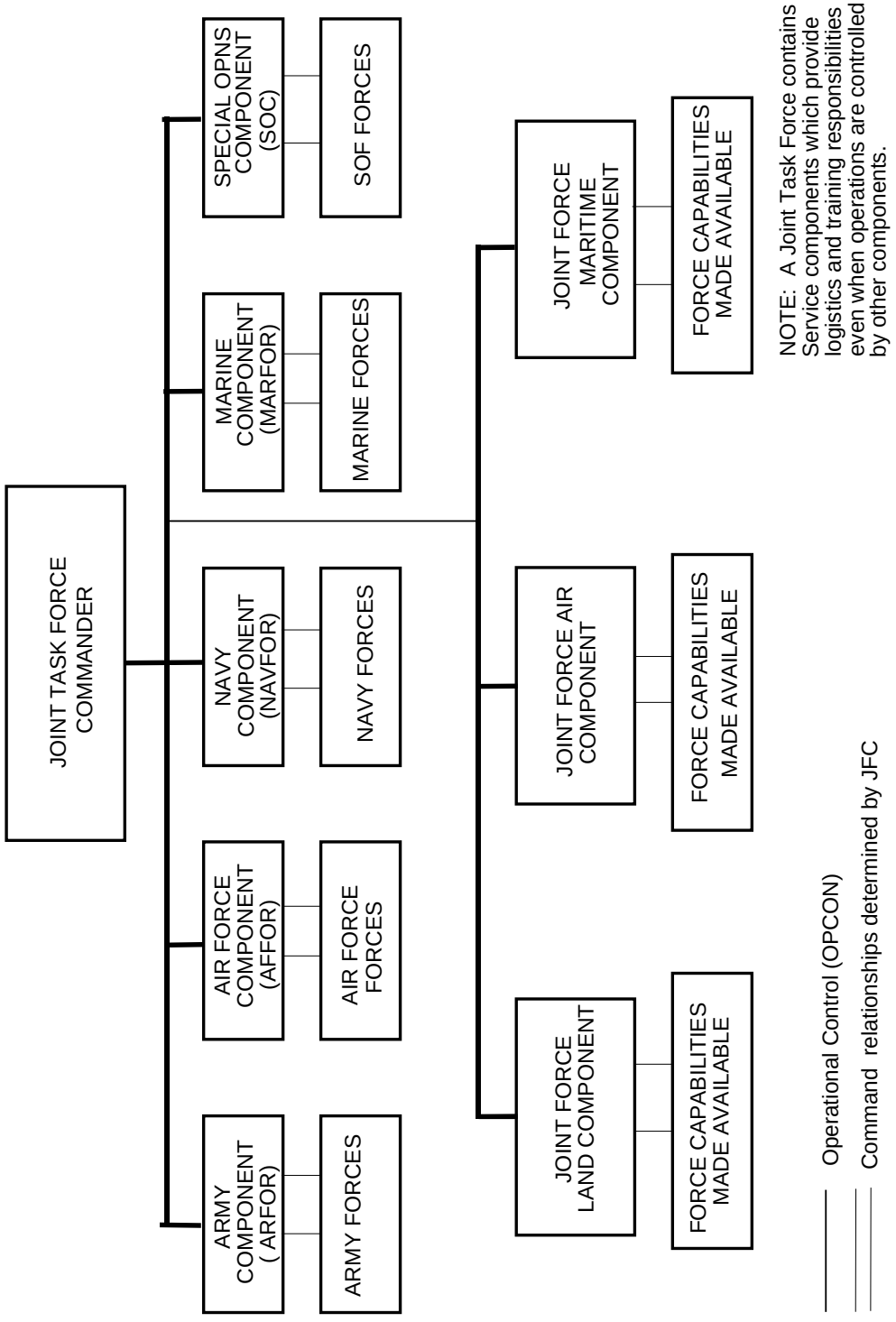
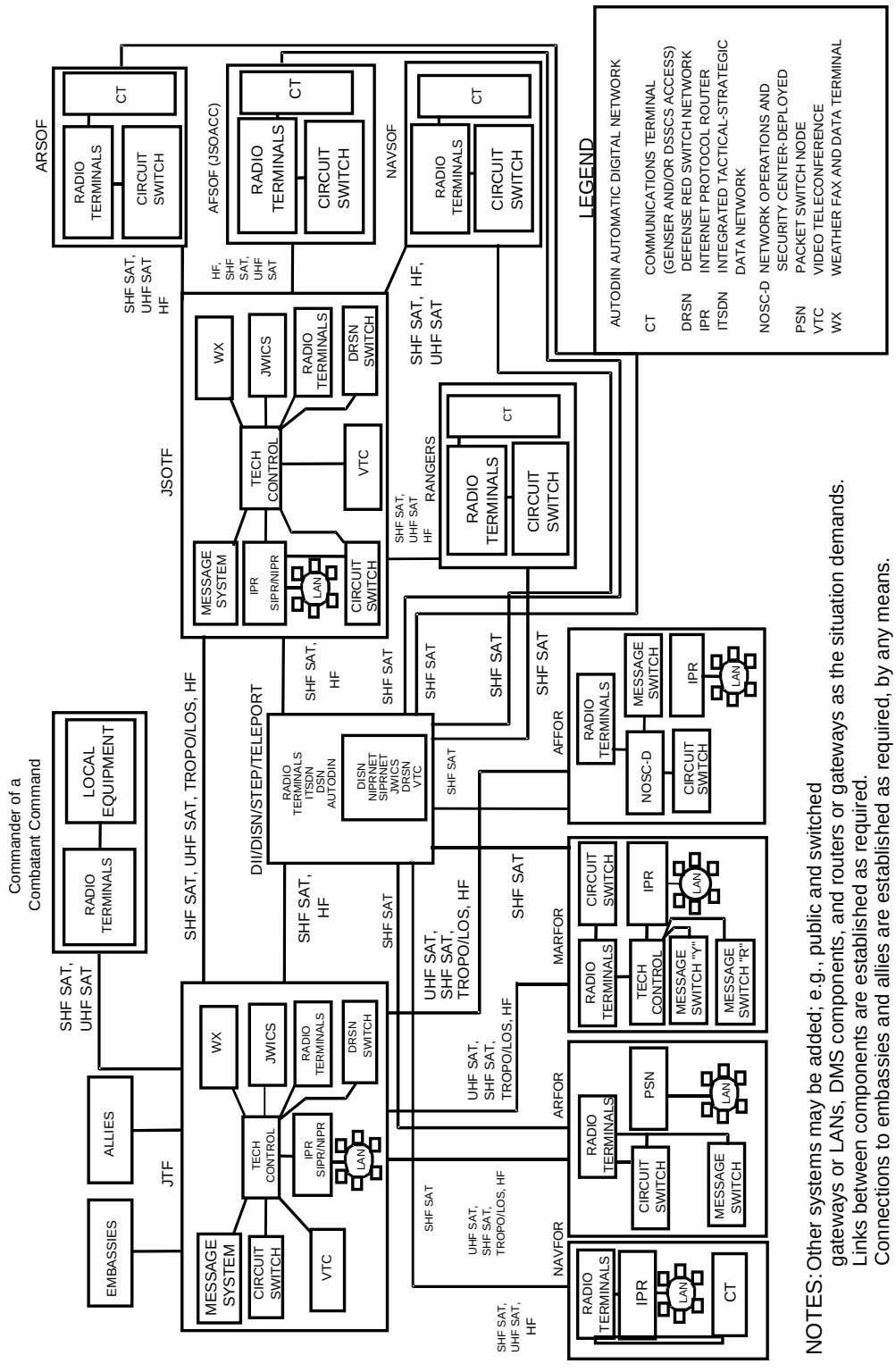


Figure B-1. Generic Joint Task Force Component Structure



NOTES: Other systems may be added; e.g., public and switched gateways or LANs, DMS components, and routers or gateways as the situation demands.
Links between components are established as required.
Connections to embassies and allies are established as required, by any means.

Figure B-2. Generic Joint Task Force Communications Systems

to the JSOTF by the CINC's subunified special operations command or by special arrangement between the CINC and CJTF. UHF and SHF connectivity between the CINC and CJTF and/or JSOTF is often provided initially by JCSE employment of UHF systems. Also, the AN/MSQ-126 tactical command system (TCS) may be deployed to provide this capability by any CINC that owns the TCS. Follow-on communications buildup is usually accomplished with theater and/or component command SHF satellite systems or other communications systems. If the total requirement for communications resources exceeds the capability of the CINC and Services to satisfy, the CINC will send a request through the Joint Staff to USCINCJFCOM. Requests for JCSE assets must be in accordance with JFCOMINST 2014.1 (currently identified as USACOMINST 2014.1). Figures B-3 and B-4 illustrate the request chain for exercises and contingencies. If JCSE assets are committed to support the CINCs' requirements for JTF/JSOTF and shortfalls persist, the CINC requests additional assets from the Military Departments through the Service component commanders, examines the possibility of using commercial satellite communications (SATCOM) systems, and may request assistance from other CINCs. This concept of resourcing applies to HF and terrestrial multichannel requirements as well.

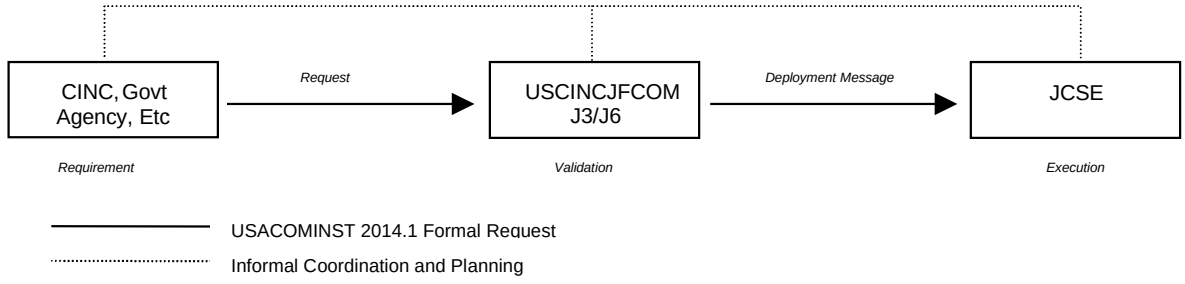


Figure B-3. JCSE Request Process for an Exercise

(3) Army (ARFOR), Air Force (AFFOR), and Marine (MARFOR) components provide terrestrial multichannel radio links (relays and both ends of link) as one of the means of connectivity between component HQ and the JTF. Additionally, the Army, Air Force, and Navy provide HF radio terminals and required terminal equipment at the JSOTF components, as well as terrestrial multichannel radio links (relays and both ends of link) as one of the means for connectivity between JSOTF components and the JSOTF. Naval Computer and Telecommunications Area Master Stations (NCTAMS) are the primary military shore interfaces

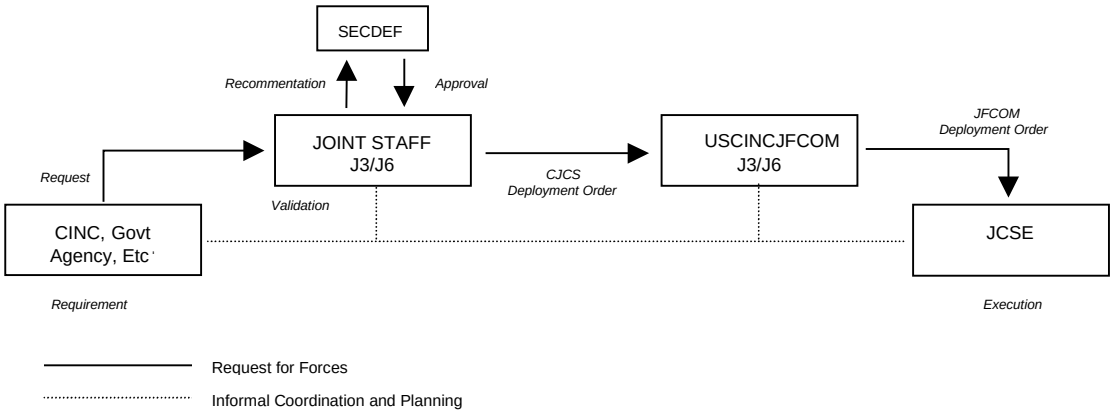


Figure B-4. JCSE Request Process for a Contingency

for communications to forces at sea, including the CJTF when embarked, Naval Forces (NAVFOR), and other embarked commands.

(4) When two or more component commanders are collocated within a geographical area, their C4 requirements are to be coordinated and consolidated to the maximum extent possible. The JTF J-6 will approve and control the sharing of certain critical assets; i.e., circuits used for IPR-based service, DNS zones of authority, TRI-TAC to MSE switching, message switching, and timing, all of which affect the entire joint network.

(5) When lateral communications are required between the CINC's component HQs, the CINC J6 will coordinate with the affected HQ to provide the service.

(6) Any Service(s) plans to provide for communications support for split-base operations between the theater and the CONUS sustaining base will be subject to CINC approval.

b. JCSE. When approved for deployment, the JCSE supports the headquarters of the JTF and JSOTF. This support includes the IOM of the communications-electronics (C-E) facilities and systems of these two headquarters and, when required, the IOM of satellite terminals at Service component and supported or supporting CINC or allied headquarters.

c. Defense Information Systems Network. Access to DISN services is provided through the DISA Defense Satellite Communication System (DSCS), standardized tactical entry point (STEP), or other DISA-provided

entry station. The DISN is extended into the joint tactical area by deployment of tactical satellite terminals. The GMF is used to make gateway connections with the DSCS facilities. Initial C3 links are established through the use of rapidly deployable tri-band or SHF terminals, and circuits that terminate at these sites. HF radio may be used prior to satellite link establishment and as a backup for operational satellite systems.

3. Responsibilities and Tasks. Responsibilities and tasks stated in this paragraph are based on the conceptual model depicted in Figure B-2. Specific taskings are contained in individual exercise directives, contingency plans (CONPLANS), operations plans (OPLANs), and operations orders (OPORDs), and follow the guidelines in this paragraph to ensure the greatest level of joint interoperability and compatibility. Annex G to Joint Pub 5-00.2 provides an excellent set of descriptions and checklists for communications support to a JTF, written from an operational perspective.

a. Supported CINC

(1) Assists the JTF commander and staff in preparing policy, communications plans, and annexes to support the operations effort.

(2) Ensures that joint forces are given the most efficient and reliable communications possible.

(3) Validates, consolidates, and submits to the Joint Staff or USJFCOM requests for JCSE support, in accordance with JFCOMINST 2014.1 (currently identified as USACOMINST 2014.1), when additional communications assets are required.

(4) Assigns frequencies to the JTF in the area of operations and makes frequency allocations to component forces on a geographic basis. Actual frequency management for the theater is performed in the CJTF JCCC.

(5) Approves, prioritizes, and allocates UHF and SHF satellite accesses supporting a joint operation.

(6) Consolidates, validates, and/or submits requests for Service (RFSs) for all circuits supporting CINC requirements in accordance with DISA Circulars 310-130-1 and 310-130-4.

(7) Assigns and activates general service (GENSER) four-letter root routing indicators (RIs) for the entire theater, assists the JTF AUTODIN planner with developing RIs and Plain Language Addresses (PLAs), and submitting activation messages to the DISA Global Network Operations and Security Center (DISA GNOSC), IAW the DISA GLOBAL CONEXPLAN GUIDE 5-2000, CJCSM 6231.07B, and ACP 117.

(8) Assigns Defense Special Security Communications System (DSSCS) four-letter root RIs for the theater, assists the AMPSSO or JTF AUTODIN planner with developing RIs and PLAs and submitting activations to DISA GNOSC and National Security Agency (NSA) in accordance with the DISA GLOBAL CONEXPLAN GUIDE 5-2000, applicable DSSCS operating instructions (DOI-XXX), and CJCSM 6231.07B.

(9) Requests DISA assign DSN and Red switch area codes and submits DSN routing messages to DISA in accordance with CJCSM 6231.02A, Chapter III.

(10) Approves and forwards requests for the intertheater COMSEC package (ICP) to the JCMO. (See USACOMINST C2281.1).

(11) Assigns internet protocol (IP) addresses and develops JTF naming convention for packet networks.

(12) Develops key management plan (KMP) or joint key management plan (JKMP) for all secure communications systems.

(13) Establishes precedence and restoral priorities for the JTF.

(14) Reviews and submits SIPRNET accreditation requests IAW CJCSM 6231.07B and other applicable documents.

(15) Is responsible for levels four and below DMS Global Directory Services registration. For more information, see DISAC 310-M70-XZ and the current version of the "DMS Deployed Concept of Operations."

(16) May establish a Theater C4 Coordination Center (TCCC) to provide C4 support to deployed CJTFs. The specific role of the TCCC, if established, would be monitoring of the theater information grid, determining operational impact of major degradations and outages and coordinating responses to degradations and outages that affect joint operations. The TCCC would serve as the single point of contact for

theater-wide communications issues within the CINC's theater of operations. The TCCC would represent the J-6 for current operations, exercises, contingencies, and peacetime engagement operations acting as a focal point for communications support efforts to subunified and component commanders, as well as JTFs operating under CINC control. At their discretion, CINCs may add responsibilities to the TCCC beyond those described in this subparagraph.

b. Commander JTF

(1) Exercises control over joint communications systems and establishes and maintains joint circuits, per unified command J-6 guidance.

(2) Establishes and operates a JCCC, as discussed in Enclosure C, and in more detail in CJCSM 6231.07B.

(3) Prepares plans and orders to support operations.

(4) Submits requests for ICP use to the CINC.

(5) Submits frequency requirements to the theater joint frequency management office.

(6) Submits GENSER and DSSCS four-letter root RIs and routing indicator requirements to the CINC.

(7) Forwards requests to the CINC in JFCOMINST 2014.1 (currently identified as USACOMINST 2014.1) format for tactical communications requirements not provided by supporting or augmenting units to provide.

(8) Uses Supplement (SUPP) 1 to the contingency Joint Communications-Electronics Operating Instruction (JCEOI) when developing single channel radio nets.

(9) Validates, consolidates, prioritizes, and forwards UHF tactical satellite (TACSAT) requirements to the CINC for channel allocation.

(10) In coordination with the supported CINC, validates the SHF requirements for access to the DISA SHF STEP sites and the required JTF tactical SHF network between the JTF, all Service component HQ, and the JSOTF.

(11) Develops and forwards SIPRNET accreditation package.

c. Commander JSOTF (COMJSOTF)

(1) Exercises control over joint special operations systems and circuits that support the operations effort.

(2) In certain situations, establishes and operates a JSOTF JCCC, with many of the same capabilities as a JTF JCCC. This would occur when the JSOTF is not operating under a JTF, or when a JTF has not yet been assembled. When part of a JTF, the JSOTF will establish a JCCC/SYSCON, being responsible for the JSOTF networks. When operating as part of a JTF, the JSOTF JCCC/SYSCON would then also be reporting status and other information to the JTF JCCC.

(3) Ensures that personnel and equipment are available to the Air Force special operations forces (AFSOF), Army special operations forces (ARSOF), Navy special operations forces (NAVSOF) and US Army Rangers to provide switching, control, terminations, facsimile, and services identified in Figure B-2.

NOTE: During joint special operations, the AFSOF may also assume the role of the joint special operations air component command (JSOACC).

d. Commander, JCSE. When directed by USJFCOM J3/J6, the Commander, JCSE, provides personnel, equipment, and services required to install, operate, and maintain communications systems, facilities, switches, servers, routers, controls, and terminals at the JTF and JSOTF HQ.

e. Commander AFFOR (COMAFFOR)

(1) Ensures that personnel and equipment are available to the AFFOR and AFSOF HQ to provide the switching, control, terminations, facsimile, and services identified in Figure B-2.

(2) Installs, operates, and maintains the AFFOR communications equipment and links described in subparagraph 2a(3).

(3) Ensures that base and post support are provided to the JCSE and Service or allied components that have communications terminals or facilities at AFFOR or AFSOF HQ.

(4) Provides management information to the JCCC, as required.

(5) Provides the communications resources required to install, operate, and maintain other portions of the joint communications system, as directed by the CJTF.

f. Commander ARFOR (COMARFOR)

(1) Ensures that ARSOF attachments, including Special Operations Command and Control Elements (SOCCE), civil affairs teams, psychological operations (PSYOP) cells, Ranger combat units, and special operations aviation (SOA) units are provided switching, control, terminations, facsimile, and services required for integration into the ARFOR communications architecture.

(2) Installs, operates, and maintains the ARFOR communications equipment and links described in subparagraph 2a(3).

(3) Ensures that base and post support are provided to the JCSE, ARSOF attachments, Service, or allied components that have communications or facilities at ARFOR.

(4) Provides management information to the JCCC, as required.

(5) Provides the communications resources required to install, operate, and maintain other portions of the joint communications system, as directed by the supported CJTF.

g. Commander NAVFOR (COMNAVFOR)

(1) Ensures that personnel and equipment are available aboard ship to meet the ship-to-shore requirements identified in Figure B-2.

(2) When required, the NAVFOR will ensure that the NAVSOF is equipped with switching, terminal, and transmission equipment that meets the NAVSOF operational requirement identified in Figure B-2 and in subparagraph 2a(3).

(3) When required, the NAVFOR will ensure Naval shore and afloat support is provided to the JCSE, SOCFOR, other Service, or allied components that have communications equipment or facilities at Navy locations.

(4) Provides management information to the JCCC, as required.

(5) Provides the communications resources required to install, operate, and maintain other portions of the joint communications system, as directed by the supported CJTF.

h. Commander MARFOR (COMMARFOR)

(1) Ensures that personnel and equipment are available to the MARFOR HQ to provide the switching, control, terminations, facsimile, and services identified in Figure B-2.

(2) Installs, operates, and maintains the MARFOR communications equipment and links described in subparagraph 2a(3).

(3) Ensures that base and post support are provided to the JCSE and Service or allied components that have communications terminals or facilities at the MARFOR HQ.

(4) Provides management information to the JCCC, as required.

(5) Provides the communications resources required to install, operate, and maintain other portions of the joint communications system, as directed by the supported CJTF.

i. DISA

(1) Employs communications resources at designated DISN entry stations and gateways to terminate long-haul tactical trunks and circuits from the joint operations area. This includes the SMU at the STEP that will provide strategic connectivity for the digital transmission groups from the tactical switches. (The appropriate DISA regional network operations and security center (RNOSC) closely supervises the allocating, rerouting, and restoring of DISN channels and circuits.)

(2) Ensures that the required entry stations, gateways, and switching centers have the appropriate equipment and cryptographic devices to terminate tactical HQ circuits deployed worldwide.

(3) Provides personnel to the JCCC, as designated in DISA contingency plans (CONPLANs).

(4) Provides management information to the JCCC, as defined in the OPLAN, OPORD, or exercise directive.

j. Defense Intelligence Agency (DIA). DIA tests and accredits all computer communications system components that process DSSCS and SCI messages. Testing and accreditation are performed in accordance with DODD C5030.58M. As the functional manager for DOD intelligence and ADP systems, DIA is responsible for promulgating standards, providing guidance on acquisition and interoperability, and participating in appropriate DOD forums to represent intelligence requirements and solutions and facilitate integration of new systems into common-user DOD communications systems supporting SCI transfers.

k. National Security Agency

(1) Certifies systems responsible for supporting secure traffic.

(2) Provides keying material, call-sign listings, and JCEOIs, as required.

(3) Reviews and consolidates temporary tactical "Y" and DSSCS activation and deactivation messages from the CINC and/or CJTF and coordinates them with DISA per CJCSM 6231.07B.

4. Coordination and Support. The CINC or CJTF may direct the attachment of communications units. Support of attached units continues to be a Service component responsibility, unless cross-Service support is coordinated by the Service components involved. The JCCC must be informed of all cross-support agreements. Units deploying to provide communications support should coordinate with the supported component prior to deployment to ensure that the deploying units know the capabilities they are expected to provide.

a. Joint Communications Site. See subparagraph 2a(4) above.

b. Circuit Extensions. When any component or the JCSE installs a transmission system (such as a satellite terminal) at a component HQ, the component or JCSE has the responsibility of connecting to the technical control or switching facility.

c. Site Support. The lead Service component on site provides operational, logistic, and administrative support to any team of the JCSE or another Service component that is providing communications service.

APPENDIX TO ENCLOSURE B

NEAR- AND MID-TERM SERVICES TACTICAL COMMUNICATIONS ARCHITECTURES

1. Introduction. This appendix provides a brief description of the Services' Tactical Communications Architectures.

2. Schedule. Table B-A-1 is a listing of the projected changes to CJCSM 6231 as a result of the Services' tactical communications architectures. In FY 2001, it is expected that CJCSMs 6231.04B, 6231.06A, and 6231.07C will be approved.

Table B-A-1. Projected Near- and Mid-Term Changes to CJCSM 6231

Volume	Projected Changes
2	SSS, ATM, STE, ISDN switches
3	STAMPS, DMS, NES, THSDN, TMS, update of TDN, deletion of certain obsolete information about the AN/TYC-39( )
4	Tri-Band Terminals (LMST, Teleport, STAR-T), MILSTAR (SCAMP, SMART-T); UFO; HCLOS, GBS
5	INE (FASTLANE, TACLANE, NES), DMS Security Architecture, update STE
6	New and revised connectivity diagrams, AN/MSQ-126, jointly approved KG strapping information
7	Update JNMS, TNAPS+, SPEED and GIG, more detailed network management reporting requirements and procedures, update to DMS information, symbology, two-part SAR/GAR, more information about IA

3. Global Information Grid (GIG). The GIG is the globally interconnected, end-to-end set of information capabilities, associate

processes and personnel for collecting, processing, storing, disseminating, and managing information on demand to warfighters, policy makers, and support personnel. The GIG includes all owned and leased communications and computing systems and services, software (including applications), data, security services, and other associated services necessary to achieve information superiority. It also includes National Security Systems as defined in Section 5142 of the Clinger-Cohen Act of 1996. The GIG supports all DOD, national security, and related intelligence community missions and functions (strategic, operational, tactical, and business) in war and peace. The GIG provides capabilities from all operating locations (bases, posts, camps, stations, facilities, mobile platforms, and deployed sites). The GIG provides interfaces to coalition, allied, and non-DOD users and systems. See Figure B-A-1.

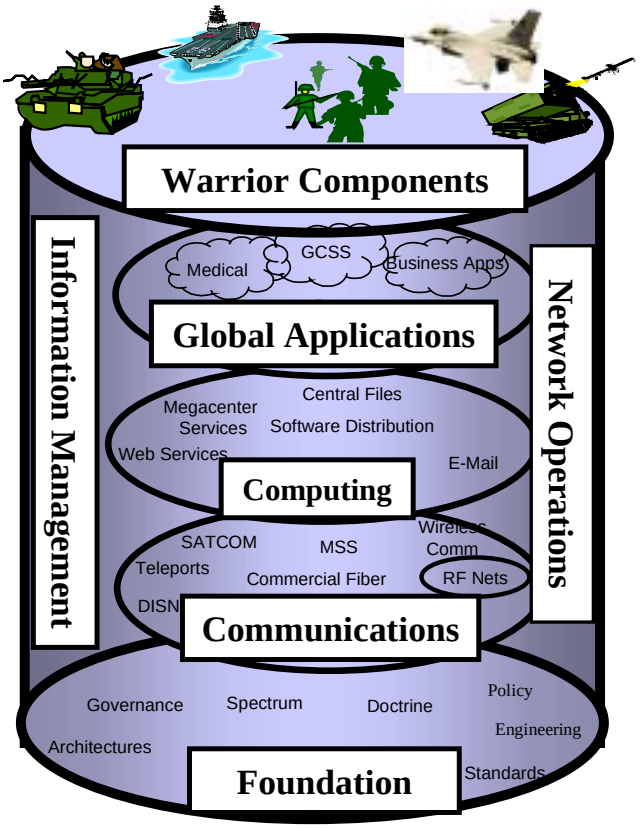


Figure B-A-1. GIG Components

ANNEX A TO APPENDIX TO ENCLOSURE B

AIR FORCE DEPLOYABLE COMMUNICATIONS ARCHITECTURE

1. Introduction

a. The Air Force component headquarters may be in the form of an Air Force forces (AFFOR) headquarters or a headquarters within an Aerospace Expeditionary Force (AEF). Other component-level structure may apply, but despite this, there will be the need for a deployed air force component headquarters to establish a communications linkage with the JTF headquarters or equivalent. The Air Force component headquarters (AFFOR, AEF, or other designation) will also need to establish and maintain connectivity with coalition forces as well as the STEP.

b. The JTF is normally supported by the Joint Communications Support Element (JCSE), although not always. Deployable Air Force communications resources are assigned to air expeditionary wings (AEWs), combat communications groups (CCGs), ground tactical air control system (GTACS) units, and other units consistent with supporting USAF operations. The AFFOR is usually supported by GTACS units; therefore, a GTACS unit at the AFFOR will normally establish connectivity with whomever is supporting the JTF (see Figure B-A-A-1). If the JTF and AFFOR are in close proximity, landline, fiber optic, or line-of-sight (LOS) microwave communications linkage could be established. In situations with the JTF and AFFOR employed at considerable distance within the theater, satellite, or tropospheric scatter microwave systems are employed for connectivity purposes.

c. STEP sites are usually out-of-theater facilities designed to provide long-haul linkage to the theater. An Air Force CCG, GTACS, or AEW is normally assigned the task of providing satellite communications from the AFFOR to the STEP site. Figure B-A-A-2 describes the high-level approach to linking the AFFOR to STEP.

d. Within the Air Force, the deployable inventory of communications assets consists of a mix of modern equipment that comply more closely with commercial off-the-shelf (COTS) standards than the older “legacy” equipment built to comply with military standards.

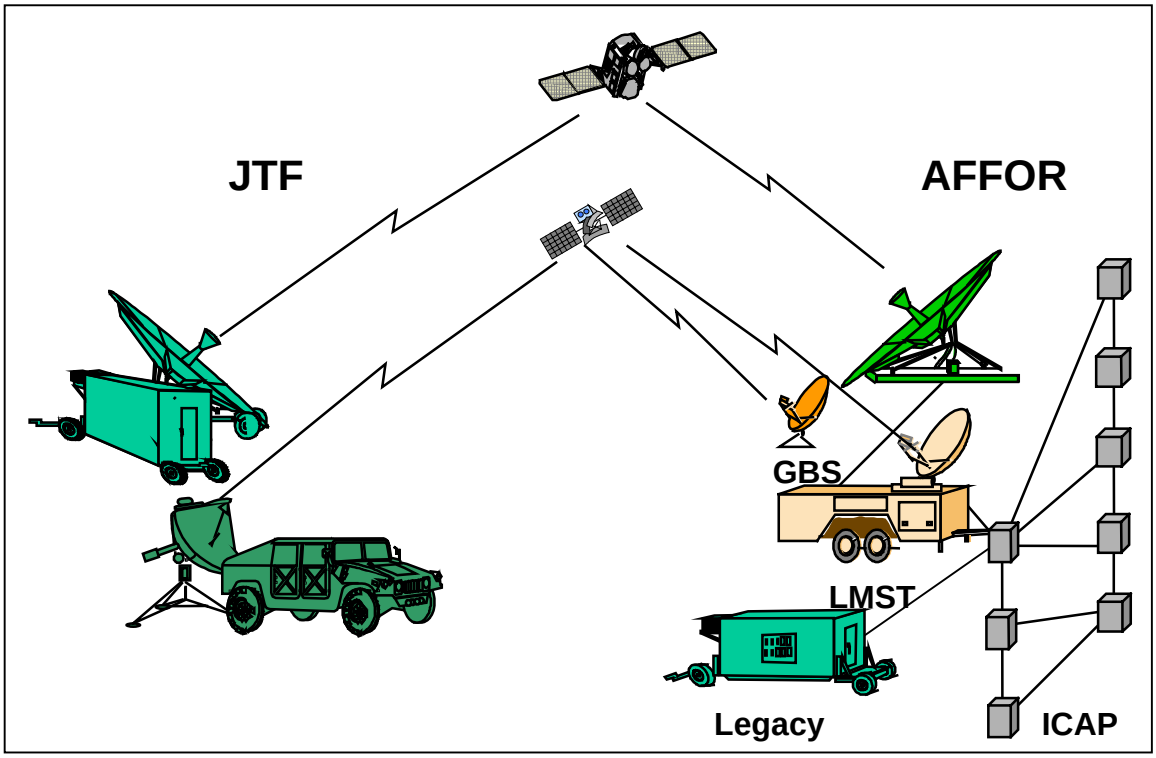


Figure B-A-A-1. JTF to AFFOR Communications

2. Theater Deployable Communications (TDC) Equipment. The most significant Air Force acquisition program within the realm of deployed Air Force communications is the TDC program. TDC provides small footprint packages designed to support current and flexible future requirements. The system is expandable as the requirement grows and is compliant with the current architecture framework of the defense infrastructure. TDC is interoperable with legacy and modern switch and transmission equipment to include host-nation telecommunication networks. TDC optimizes battlefield management provide by TBMCS, web-based processes, and merging systems. TDC consists of deployable packages composed of two subsets, the lightweight multiband satellite terminal (LMST) and the integrated communications access package (ICAP). These subsets offer a new capability designed to augment and, in many instances replace, aging TRI-TAC equipment and GMF satellite communications terminals. TDC features COTS equipment providing a tactical communications architecture compatible with commercial

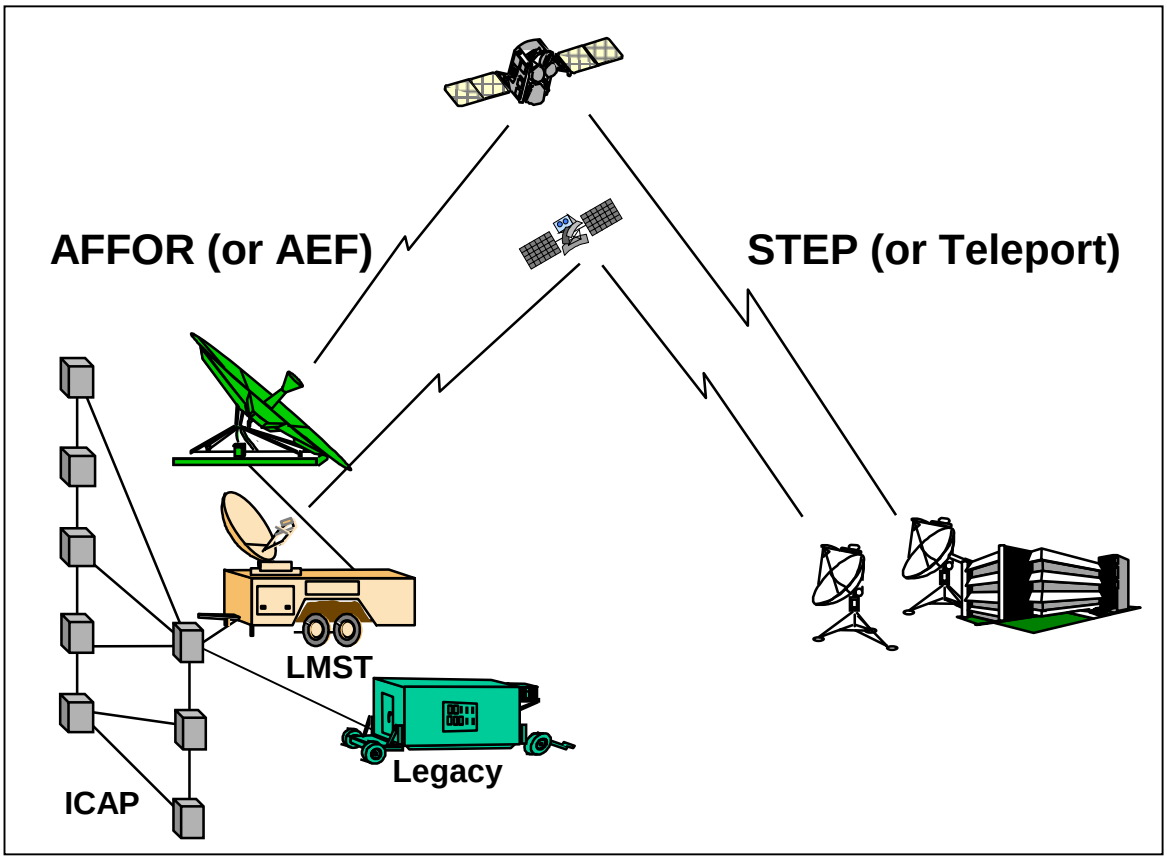


Figure B-A-A-2. AFFOR to STEP Communications

standards based networks in the military's strategic infrastructure as well as the civilian sector. For instance, TDC features the same digital standard for circuits and trunks as provided by commercial carriers. ICAP consists of a number of switching, multiplexing, cryptographic, and interfacing elements packaged as modules.

a. Lightweight Multiband Satellite Terminal (LMST). The LMST earth terminal is the long-haul space communications segment of the TDC program. Commercial satellites are increasingly used to provide additional capability to deployed forces. As a dual-spoke satellite earth terminal, TDC's LMST has the tools to simultaneously provide military and commercial services. It is a self-contained unit with dual generator systems and a 29-gallon fuel supply. The LMST can operate in C-and K_u-bands at data rates up to T-1 (E-1 in K_u-band in Europe) and in X-band at signaling rates up to 1152 Kbps over Defense Satellite

Communications System (DSCS) satellites. It is interoperable with current GMF satellite terminals and compatible with TRI-TAC and TDC voice and data switching equipment. Commercial industry standard and military specification connectors built into the signal entrance panel and coupled to flexible baseband equipment allow the LMST to interface with legacy TRI-TAC and newer ICAP equipment without modification. The terminal weighs 6,500 pounds and has an integral 2.4-meter tri-band antenna on top of the trailer and an external X-band antenna port to accommodate a 6.1 meter quick reaction satellite antenna (QRSA). Plans are in-progress to add K_a-band and tropospheric scatter capability to the LMST. For more information on the LMST, see CJCSM 6231.04A.

b. Integrated Communications Access Package. ICAP is a transit case-based suite of modules providing a voice and data networking and switching fabric for an employed site as well as access to long-haul facilities, but does not provide long-haul capability (i.e., the LMST and other deployable assets provide long-haul service). The color-coded ICAP transit cases support a scaleable architecture that provides building blocks to satisfy a range of requirements for the employed warfighter. Terminal, private automatic branch exchange (PABX), multiplexing, and routing equipment in the ICAP provides switched voice, data, and DMS. ICAP modules are man-transportable and designed to interface with the unique standards of legacy equipment. Multiple ICAP modules will be distributed, as appropriate, to serve various user concentrations at a deployed location. The modules will be interconnected in the site environment via optical fiber links and LOS systems (microwave radios and laser transceivers). GMF satellite terminals, LMST, or legacy terrestrial radio systems (e.g., AN/TRC-170) will provide the ICAP users with intra and intertheater connectivity to other deployed forces. GMF and LMST terminals will also provide connectivity to DISA STEP sites or reachback locations to access fixed, strategic, common user networks. The ICAP suite consists of modules listed in Table B-A-A-1. The ICAP modules are supported by various kits that aid with repair, handling, cabling, configuring, and sustaining the communications mission.

c. Other Features of TDC. The Air Force deployable communications mission is supported by a range of other capabilities. Included in this category are deployable generators, uninterruptable power supplies

(UPS), Land Mobile Radios (LMRs), UHF SATCOM radios, and some terminal equipment.

Table B-A-A-1. ICAP Modules

ICAP Module	**Function**
Basic Access Module (BAM)	Access, voice and data switching & backbone connectivity
RED Router Module (RRM)	RED data access & interface to joint services
RED Hub Module (RHM)	RED data access & backbone connectivity
Secure Voice Module (SVM)	Secure voice conferencing - works with STU-IIIR module (upgrade in-progress to support STEs)
STU-IIIR Module (STUM)	16 simultaneous secure voice conferences (STE-R upgrade in-progress)
P-Mux Module (PMux)	Provides multiplexing demultiplexing for off-base and on-base connectivity as well as echo cancellation and voice compression
Crypto Module (CM)	Trunk encryption for off-base connectivity, CDI to NRZ conversion & the ICAP primary reference timing source
Radio Frequency Module (RFM)	Wireless linkage between ICAP nodes via microwave radio
Laser Module (LM)	Wireless connectivity between ICAP nodes via laser
TSSR Interface Unit (TIU)	ICAP baseband compatibility with existing TSSR radios (i.e., AN/GRC-239) - same functionality as RFM
Large Voice Module (LVM)	Has twice the number of phone lines (loops) as a BAM
Crypto Interface Module (CIM)	Interfaces external crypto equipment to the ICAP along with a medium sized routing capability

(1) The air component Chief Information Officer (CIO) exercises control of the theater enterprise from the deployed Network Operations and Security Center (NOSC-D) that includes a number of subordinate Network Control Centers (NCCs). Included, also, is a Network

Management System/Base Information Protection (NMS/BIP) capability. An NMS is established to oversee the information transport system to provide systems and configuration management of local area networks operating at host and tenant organizations on the base. Normally, network management functions are consolidated forming a single unified network management capability on-site. The NMS provides trouble reporting functions (detecting and isolating abnormal network operation) and automated trouble ticket (repair work order) generation. System configuration, changes to system configurations, network components, applications running on the network and entities using the network can be tracked, recorded, and controlled through the NMS functions. Network performance is tracked with NMS, and resulting analysis allows the administrators to make adjustments to the network achieving optimal performance and increase user satisfaction. Base information protection (BIP) provides an information firewall to ensure unauthorized intrusions or attacks are thwarted, thus protecting base networks and critical information. BIP provides the information protect tools for each deployed Air Force activity to detect, deter, isolate, contain, reconstitute, and recover from information systems and network security intrusions or attacks.

(2) Keeping TDC up-to-date with rapidly moving technology will be done with a continuing process of experimentation, spiral development, and block upgrade. Slated improvements to ICAP include: secure telephone equipment (STE), asynchronous transfer mode (ATM), and a T-3 capable LOS microwave set.

3. Near-Term (2000-2005) Capability. By CY-2003, TDC will be able to satisfy deployed Air Force missions, and the requirement for legacy assets will greatly diminish. Meanwhile, the Air Force will be operating TDC and legacy equipment in parallel as needed. By the end of 2005, the AN/TSQ-111s, AN/TSQ-146s, and AN/TYC-39s will no longer be in the inventory. It is possible that some legacy equipment will need to be maintained beyond CY 2005 depending on the level of legacy assets maintained in other inventories (e.g., other Services). The LMST will gradually assume the duties of selected GMF spoke terminals (e.g., AN/TSC-94A and AN/TSC-93B) while also supporting simultaneous C, and K_u-band requirements. A hub variant of the LMST will be introduced to the inventory before 2005, and K_a-band capability will be

inserted in all LMST earth terminals. Promina multiplexers will support most trunking requirements, while AN/FCC-100s and LTUs will support residual multiplexing requirements. Great strides in the availability of communications technology is expected to continue, but with the flexibility of the modular framework of TDC, the insertion of new technology will be made easier. Bandwidth requirements for a typical tactical trunk may grow by as much as 1 Mbps per year.

4. Mid-Term (2005-2010) Capability. The future, both mid term and long term, is like the present in that there will be voice, data, and video requirements to satisfy. While there may be significant changes to the components within TDC to keep pace with rapidly advancing technology, the mission configuration will be designed to appropriately match requirements. The mid term will feature the predominance of COTS-based deployable assets. During this period, all GMF terminals plus the AN/TTC-39s will be retired. The AN/TRC-170 troposcatter system, modified to support COTS trunking technology, will be retained. Some earth terminals may be modified to perform dual troposcatter and satellite roles.

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ANNEX B TO APPENDIX TO ENCLOSURE B

ARMY TRANSITION PLAN

1. Introduction. This annex provides a capsule description of the Army's programs as planned for in the near term (FY2000-FY2005) and mid term (FY 2005–2012).

2. Near Term. The near-term changes to the architecture are upgrades to the current area common user system (ACUS) and life cycle replacements programs of satellite transport systems.

a. Tactical High Speed Data Network (THSDN). THSDN is a modernization of most switches in the TRI-TAC and MSE systems that increase the data capability of the ACUS. The current Tactical Packet Network (TPN) provides a 16 Kbps data capability that does not support the constantly growing data requirement of the force. THSDN will upgrade the system to 512 Kbps data capability with the uses of HSMUX cards, ETGMOW cards, and CISCO Routers. THSDN will replace the current tactical name server (TNS) with a domain name server (DNS) that is compliant with commercial standards. THSDN also provides the capability to support both H.320 (serial) and H.323 (IP) VTC system interfaces. Upgrades to the AN/TTC-39D, -46, -47, and -50 will include replacement of TGMOW and DLMPA cards with ETGMOW and HSFEC cards, addition of a CISCO 3640 router and access control software, upgrade of ESOP workstation hardware and software, and interface to the TPN. The upgrade to the AN/TTC-48 will include addition of HSMUX and HSFEC cards, a CISCO 3620 router with PCMCIA interface and access control software, an uninterruptable power supply, and interface to the TPN.

b. Single Shelter Switch AN/TTC-56 (V)1. The AN/TTC-56 (V)1 is a downsized functional version of an AN/TTC-39 PS housed in a lightweight modular shelter (LMS). The AN/TTC-56 (V)1 is comprised of a compact digital switch (CDS) and a switch multiplexer unit (SMU) in a redundant switch configuration. The switch supports 18 DTGs, 146 external loops, a CISCO 3640 router, a TPN switch and gateway, and COMSEC (AKDC, 16 LKGs, 9 TEDs, 1 KY-57). This program does not replace all of the AN/TTC-39s. When a unit receives the new switch, the AN/TTC-39PS is moved to the Reserve Component to replace older AN/TTC-39As. Figure B-A-B-1 shows the external interfaces the AN/TTC-56 (V)1 can support.

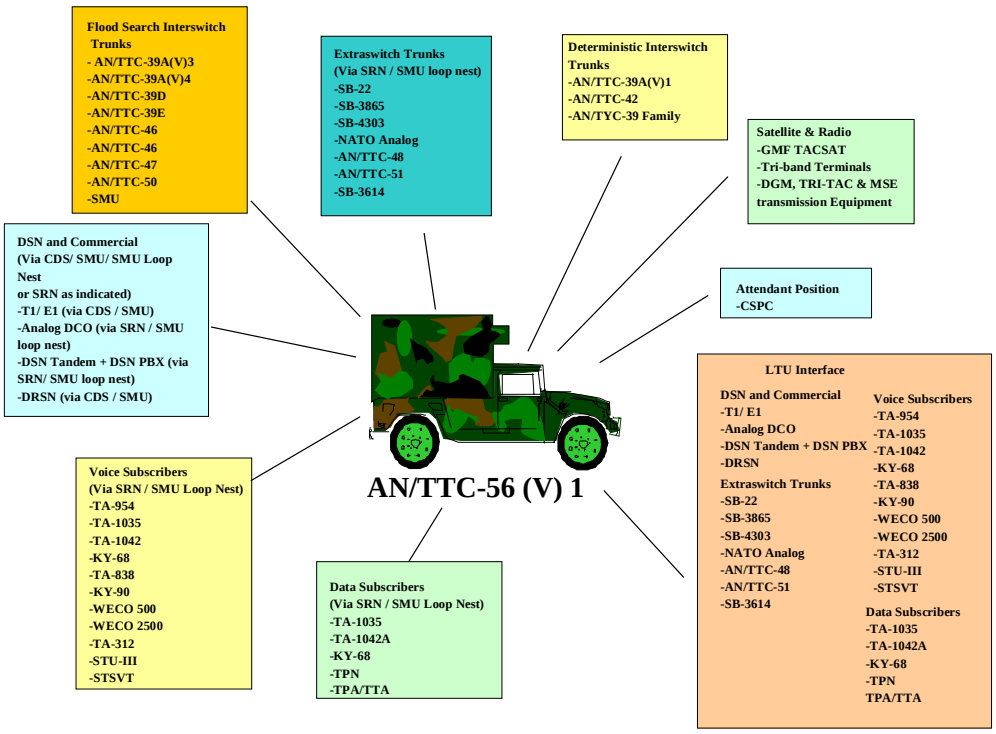

Figure B-A-B-1. AN/TTC-56 (V) 1 External Interfaces

c. First Digital Division (FDD) (FY 00) and First Digital Corps (FDC) (FY 03). In support of the Army Warfighter Experiment (AWE) efforts with III Corps the FDD and FDC program was developed. The FDD is the starting point (FY00), with the modernization of 4ID (124th Signal Battalion) existing MSE systems to be more efficient and provide a much greater switching capability. All AN/TTC-47s and AN/TTC-48s will be modified to begin the evolution of tactical switching systems toward commercial standards. The AN/TTC-46 large extension node (LEN) will not be upgraded. ATM switches and IP routers will be added to current switching shelters. BVTC equipment and multiconferencing units (MCU) will also be added to the FDD system. A fiber optic link that supports a data rate of OC-3 will replace the current coaxial cable (4096 Kbps) interface between the NCS and the LOS (V) 3 assemblage. The LOS (V) 3 will be upgraded with the high capacity line of sight (HCLOS) radio that will allow LOS interfaces of 8.192 Mbps to a distance of 40 Km. Security protection mechanisms will be installed (e.g., access control lists, firewalls, guards, intrusion detection systems, malicious code detection,

automatic password generation, digital signatures, encryption capability, information assurance management capability, and network mapping) in accordance with the applicable DOD and Army regulations and appropriate network security policy. The FDC will begin in FY 03 and will use the same system used with FDD but will upgrade the complete corps and its divisions.

d. Tactical Message Switch (TMS) Defense Messaging System. The DMS program is the DOD-wide implementation of a standards-based, secure, worldwide electronic messaging system that has been designed to provide seamless, secure messaging services to the warfighter in both garrison and deployed tactical environments. Access and use is basically the same as in garrison with very little differences in procedures or equipment. One unique piece of equipment is the TMS. The TMS is a sheltered version of computer and communications hardware and the DMS software suite mounted on a prime mover. All DMS intra/inter traffic into and out of the tactical area of operations is routed through the TMS. Fielding plans include two TMS sets per corps or division and one per EAC unit. Within this overall program, the specific missions and goals of the DMS-Army program are to:

(1) Provide a replacement for the current AUTODIN system. This includes replacing current AUTODIN strategic/sustaining base components like AUTODIN Switching Centers and local telecommunications centers, and tactical messaging components such as the AN/TYC-39A Automatic Message Switch and the AN/UGC-144 Communications Terminal.

(2) Standardize all Army electronic mail (E-mail) systems by implementing a vigorous program of upgrading or replacing current proprietary or Simple Mail Transfer Protocol (SMTP) based systems with ones that are DMS compliant.

e. Secure Mobile Antijam Reliable Tactical Terminal (SMART-T). The current distribution plan is to provide each corps signal brigade with 15 SMART-Ts and division signal battalions with 12 terminals. The SMART-T is a pallet-mounted, EHF satellite terminal transported by a heavy HMMWV. An onboard generator is provided. The system does not require a trailer. The terminals will be deployed at MSE switches as required. The SMART-T is an EHF multichannel satellite terminal that will provide range-extended, multichannel connectivity between selected MSE suites at division and corps. The SMART-T provides a protected

antijam communications capability using the MILSTAR satellite constellation. The system will operate unattended while remotely monitored by the switch operator on a laptop. It will have the capability to support the transmission requirements of an MSE node (consisting of up to 4 trunk groups each containing 16, 32, or 64 channels). The terminal provides 4 LDR (2.4 Kbps) ports and 10 MDR ports for individual subscriber connectivity. The SMART-T will be capable of performing, on order, as the access control station to authorize or remove authorization from users in each network. The terminal will be able to extract status information to allow proper management of the network.

f. AN/TSC-156 SHF Tri-Band Advanced Range Extension Terminal (STAR-T). The AN/TSC-156(V)3/4 is being provided as part of the Tactical Tri-band Terminal (HMMWV) (T3(H)) program. This program combined the requirements of the United States Army, United States Special Operations Command (USSOCOM), JCSE, and United States Marine Corps (USMC). The basic requirements of these users were very similar and a great many common parts will be used. The Army will use two primary configurations; the AN/TSC-156(V)3 (also used by the USMC and JCSE) and the AN/TSC-156(V)4 with subtypes.

(1) AN/TSC-156(V)3 Standard Version

(a) The AN/TSC-156(V)3 standard version will consist of crew removable, pallet mounted radio frequency (RF) equipment, baseband equipment, antenna, and power source. This version will also be equipped with a trunk group multiplexer (TGM) to allow operation with MSE MDTGs. The 12 input ports of the enhanced TSSP allow a wide range of military and commercial inputs to be multiplexed over the satellite. This includes inputs that normally would have to be multiplexed by a first-level multiplexer.

(b) The standard version will be transported by two heavy HMMWV (HHVs). The first HHV will carry the integrated system pallet and two operators with their personal and mission gear. The second HHV will carry a pallet-mounted, 10 kW tactical quiet generator (TQG), its fuel cell (for 24-hour operation), the third operator with personal and mission gear, and ancillary equipment, including cable. Both HHVs will provide short-term (24 hours) back-up power using 400 amp kits. External alternating current (AC) power can also be used.

(2) AN/TSC-156 (V) 4 and (V) 5 Switch Version

(a) There are two switch subtypes, (V)4 light support and (V)5 heavy support, to meet user requirements. The only difference in the two subtypes is the amount of ancillary equipment that will be carried to terminate subscribers. The (V)4 will be capable of terminating at least 140 subscribers. The (V)5 will be capable of terminating at least 280 subscribers. On both versions the primary switch system vehicle will be capable of terminating at least 48 subscribers.

(b) The switch version will be identical to the standard version (RF, baseband, antenna, etc.) with the exception of COTS circuit and data switching equipment integrated into the system pallet. The complete switch operating system will be integrated into the system processors.

(c) The switch version will use a commercially based Integrated Services Digital Network (ISDN) circuit switch with a wide array of interfaces. Two HHVs will transport the switch version. The first HHV transports the crew-removable, pallet-mounted system with integrated primary circuit switch and equipment to support at least 48 subscribers, and 7 X.25 and 2 802.3 Local Area Network (LAN) connections. The first HHV will also transport two crewmembers with their personal and mission equipment. The second HHV will carry a pallet-mounted, 10 kW TQG, its fuel cell (for 24-hour operation), and ancillary equipment to terminate additional subscribers. The second HHV will also transport two crew members and their personal and mission equipment.

g. Single Channel Antijam Manportable (SCAMP) Terminal. The SCAMP is a single channel terminal designed to interface with the MILSTAR LDR payload. It can also operate over EHF packages on FLTSAT and UFO/E. The terminal will operate in point-to-point and broadcast modes providing voice and data service at a maximum data rate of 2.4 Kbps. SCAMP will provide highly survivable, protected command and control communications links and Low Probability of Intercept/Low Probability of Detection (LPI/LPD), with built-in TRANSEC and COMSEC with Over-The-Air Rekey (OTAR). See figure B-A-B-2.

h. AN/PSC-5, SPITFIRE UHF Single Channel TACSAT DAMA-Capable Terminal). The AN/PSC-5, SPITFIRE is a small, lightweight, manpack, vehicular, and airborne configurable single channel, UHF satellite terminal that operates in both 5 KHz and 25 KHz DAMA modes.

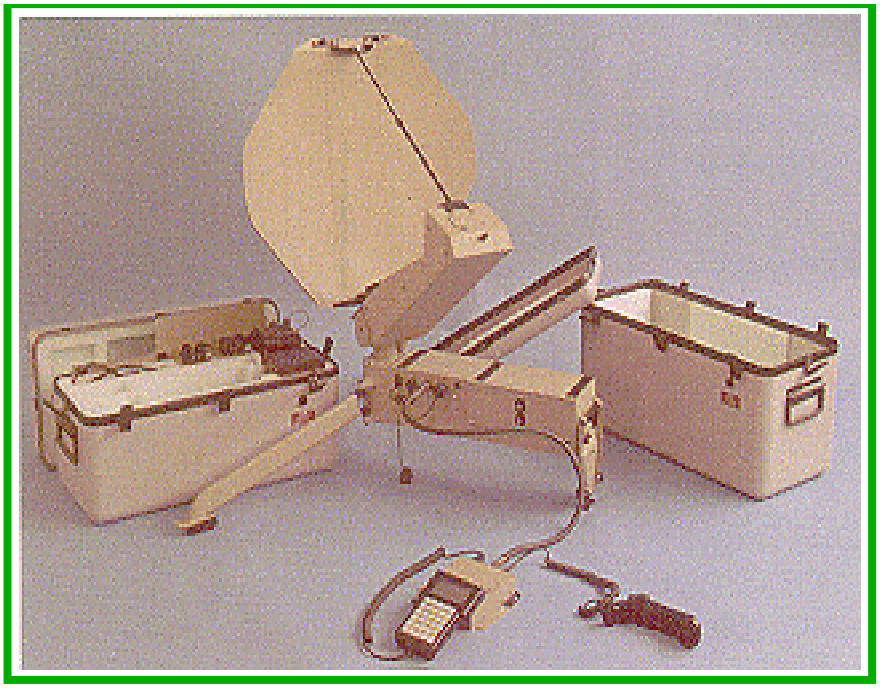

Figure B-A-B-2. SCAMP

SPITFIRE is replacing the AN/PSC-3, AN/VSC-7, AN/MRC-140, AN/PSC-7, and AN/PSC-10 terminals. It will use demand assigned multiple access (DAMA) and COMSEC compatible with the Advanced Narrow Band Secure Voice Terminal (ANDVT). It will also have embedded COMSEC and TRANSEC capabilities for data, voice, and orderwire communications. These capabilities will be compatible with the KY-57, KG-84, KGV-11, and KY-99/KYV-5. The SPITFIRE provides line of sight (LOS) and satellite communications in the VHF and UHF bands. All previous capabilities will be maintained from earlier versions of UHF SATCOM terminals with the addition of DAMA and ANDVT COMSEC. DAMA allows the users greater access to the limited satellite resources via a DAMA controller. Currently, the Navy will provide DAMA control on 25 KHz satellite channels and the Air Force will provide control of 5 KHz satellite channels.

i. Global Broadcast System (GBS). GBS is a DOD information distribution system using SATCOM capabilities to efficiently deliver products to large numbers of deployed, on-the-move, or garrisoned forces that may be spread extensively throughout an area of operations. The

ability to disseminate large amounts of data to multiple users simultaneously has tremendous military potential. GBS will augment and interface with other communications systems and provide a continuous, high-speed, one-way flow of high-volume information. GBS collects and assembles products for broadcasts, transmits the information at scheduled times and receives the products addressed to the users serviced by each receive terminal. A commander could receive a wide variety of information depending upon mission requirements. These might include situational awareness and command and control products (overlays, orders, JSTARS data), imagery (digital photographs and live video), weather, logistical data, personnel and finance support, and morale and welfare products (AFRTS, CNN). Products with different classifications (unclassified, SECRET, and selected formats) can also be handled by GBS. GBS will operate as a system of broadcast satellites, fixed and transportable injection points, receive terminals, and the broadcast management systems needed to disseminate information to users dispersed over large geographic areas. See Figure B-A-B-3.

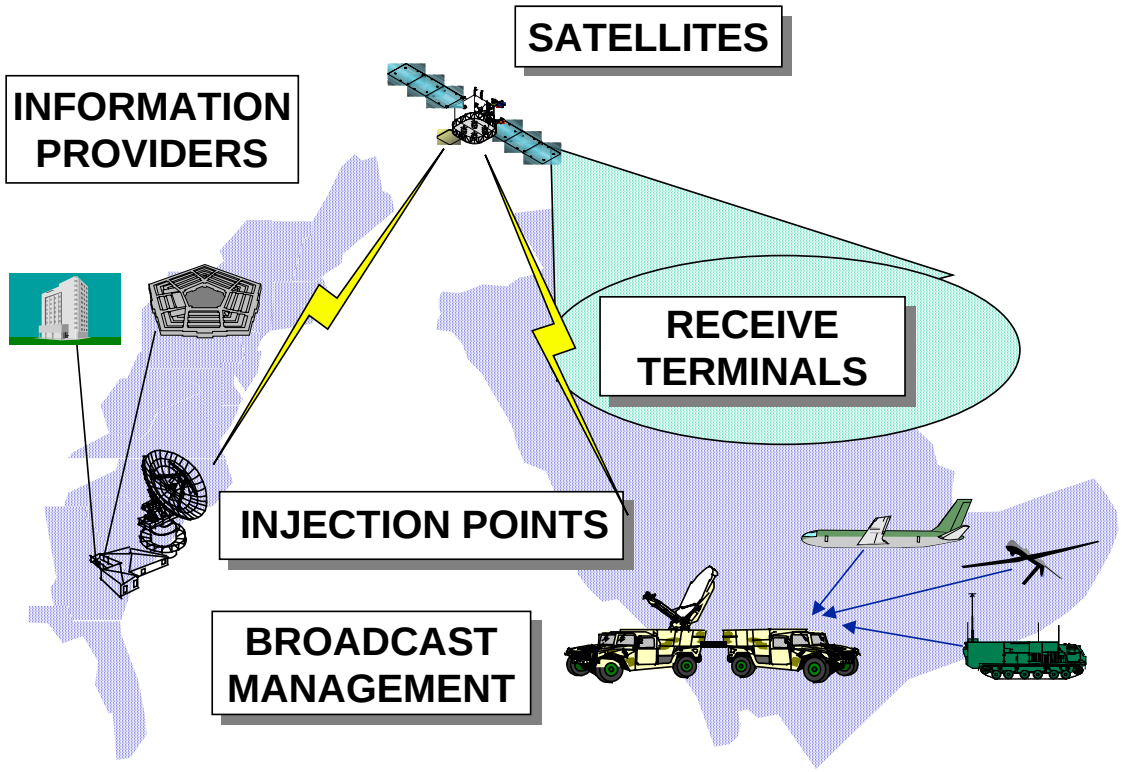

Figure B-A-B-3. Global Broadcast System

j. Integrated System Control (ISYSCON). The ISYSCON will provide the signal commander and staff with an integrated, automated planning and control capability. The ISYSCON will assist in managing communications systems in support of combat forces, weapon systems, and battlefield automated systems. It will function as the battlefield signal management system at the maneuver battalion through theater echelons and will also support independent Army and JTF operations. ISYSCON will provide the necessary tools to perform the information management process by automating these essential functions: network planning and engineering (NPE), WAN management, mission plan management (MPM), battlefield spectrum management (BSM), COMSEC management, and system administration (SA). The ISYSCON will incorporate standard CHS computer workstations into a LAN and will perform signal command and control, distributed database management, and engineering task processing. It will be equipped with an organic communication capability (SINCGARS, EPLRS, IHFR) and will pass data to remote planning terminals over the ACUS/TPN. The ISYSCON will provide the theater signal command (Army), EAC signal brigades, battalions, and companies, corps signal brigades and battalions, and division signal battalions the capability to manage the planning, integration, allocation, use, and operation of most all communication systems: ACUS, CNR, MILSTAR, TACSAT, Tactical Internet (TI), TOC/CP LANs, and EPLRS. ISYSCON will be capable of planning and controlling Army tactical networks and communication assets. ISYSCON will electronically interface with other ISYSCONs and other battlefield automation system to perform system planning, control, monitoring, and gateway management. It will use a standard terrain database for NPE and BSM. It will perform WAN management; therefore, it must interface with ATCCS BFA hosts for the exchange of critical C2 data. The ISYSCON will also provide the capability to store and use information regarding non-Signal Corps and noncommunication emitters in managing the spectrum. ISYSCON system management capabilities will provide for the monitoring and management of communications network status and performance. The ISYSCON system will provide a complete view of battlefield WAN configuration and operational status. This view will be used to determine if battlefield communication requirements are being satisfied and how best to employ network elements in the future. The ISYSCON implementation can be readily expanded to support the networks of other services or commercial systems. There are currently four versions of ISYSCON to support different levels of management responsibilities.

(1) ISYSCON (V)1. Base configuration for S-3 staff (see Figure B-A-B-4). Fielded to TSC (A), EAC/corps signal brigades and division Signal battalions.

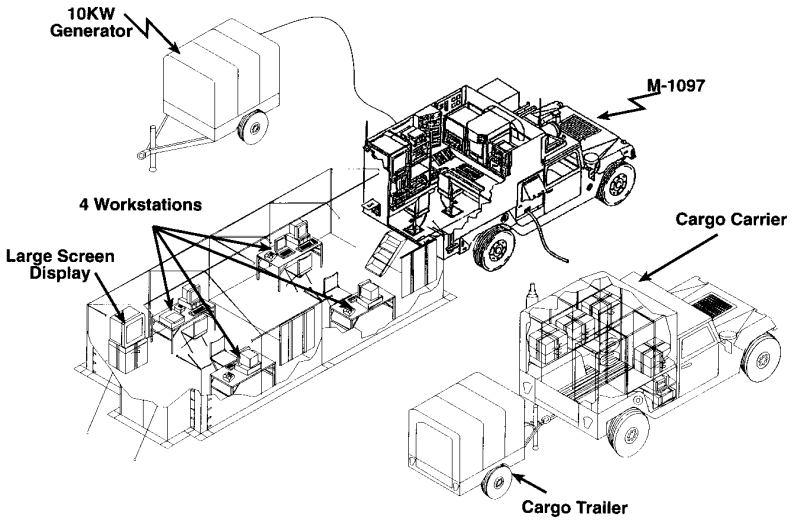

Figure B-A-B-4. ISYSCON (V) 1

(2) ISYSCON (V)2. Will include all of the component software of (V)1. Fielded to EAC/corps signal battalions.

(3) ISYSCON (V)3. Will include scaleable software of (V)1. Fielded to EAC nodes.

(4) ISYSCON (V)4. Tactical internet network manager and tactical operations center or command post LAN manager.

3. Mid Term. The mid-term programs support the Army's digitization program and rapidly changing warfighting doctrine demand of substantial increase in communications capacity, as well as advances in information security, mobility, efficiency, and transparency to the user.

a. Warfighter Information Network–Tactical (WIN-T). WIN-T is the Army's tactical communications network from theater to battalion level. The major WIN-T elements are network infrastructure (integrated

switching, routing, transmission), information assurance (IA), network management, and user interfaces that provide voice, video, and data service throughout the battlespace. WIN-T's elements will be modular in design, scaleable to the users' requirements, and capable of adapting to the evolution of the battle. WIN-T will be bandwidth and spectral efficient, compliant with the Joint Technical Architecture (JTA), a commercial standards-based network that is easy to upgrade, operate, maintain, manage, and train. WIN-T will replace all legacy TRI-TAC and MSE systems. WIN-T will replace the communication functionality of the TROJAN SPIRIT system. See Figure B-A-B-5.

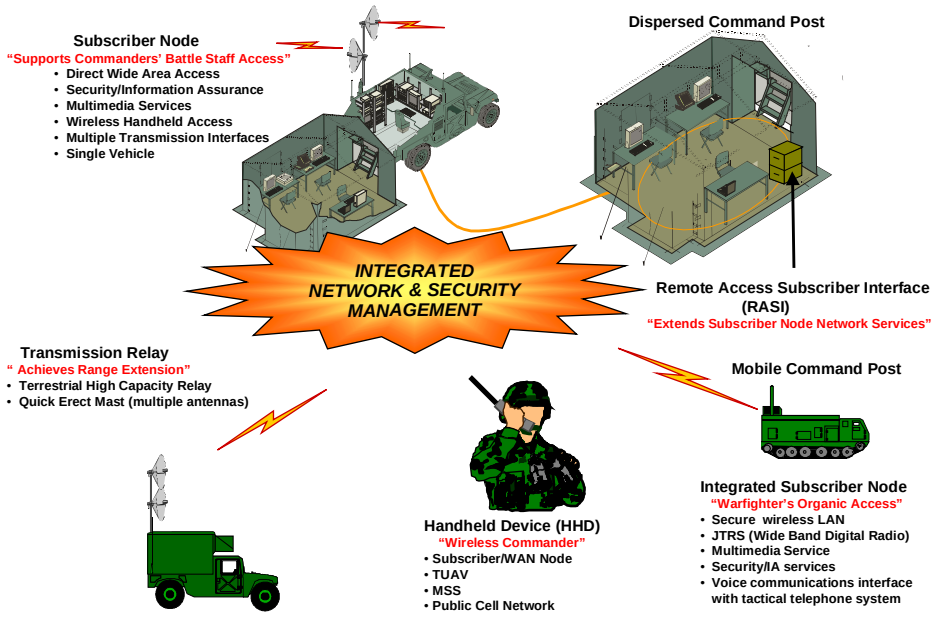

Figure B-A-B-5. WIN-T Components

(1) Network Infrastructure. Two types of nodes comprise WIN-T: subscriber node and integrated subscriber node. Each node has switching, routing, transmission and relay systems, management, information assurance, and subscriber services integrated with the capability to interface with terrestrial, satellite, tropospheric scatter (TROPO) radios, beyond line of site radios, and commercial facilities to meet the needs of supported units. These nodes may extend subscriber connectivity to remote locations using a remote access subscriber interface (RASI). These nodes provide the warfighter with a high

capacity, information transfer infrastructure that enables the exchange of large volumes of C2, intelligence, and logistical data among users. The integrated subscriber node is a combat arms (maneuver) brigade or battalion asset (including supporting battalions such as combat engineer, field artillery, cavalry squadron) that is integrated into warfighter platforms.

(a) Switching and routing technology at the nodes will be based on commercial standards. A tandem routing capability will be provided to support voice, data, messaging and video information exchange requirements throughout the theater. To enhance network survivability, WIN-T will automatically allocate bandwidth and route information over multiple transmission paths, bypassing outages and congestion.

(b) Transmission systems consist of high-capacity line-of-sight (HCLOS) radios that use quick erect antenna masts, fiber-optic cable, and wideband digital radios to provide the bandwidth necessary to support transmission of information between the nodes that support warfighter command post throughout the Army XXI battlespace. The radios will provide connectivity using LOS and beyond line-of-sight (BLOS) relay between WIN-T nodes, forming a backbone transmission network, and will replace current low bandwidth LOS radios. For range extension, WIN-T will use terrestrial relays, TROPO radio, unmanned aerial vehicles and satellite systems to connect command posts that are BLOS.

(2) Network Management. Signal soldiers will employ network management tools to configure, monitor, and maintain WIN-T infrastructure, IA systems, and user interface devices. Network managers will have the capability to remotely manage, configure, and monitor the wide area network LANs and terminal devices throughout the theater. The WIN-T network management system will provide an interface to the JNMS.

(3) Information Assurance. WIN-T's common communications backbone will support multiple security levels; i.e., TOP SECRET/sensitive compartmented information (TS/SCI), SECRET, and sensitive but unclassified (SBU). IA will provide end-to-end security consistent with the classification of the information passed over the WIN-T network, by providing an integrated defense in depth approach that starts at the DISN and extends down to individual user devices. IA

capabilities will be embedded in each node to detect network attacks, provide immediate protection, and alert the WIN-T network managers and users.

(4) User Interfaces. WIN-T will provide two versions of terminals that will enable the communication over the network.

(a) WIN-T will provide selected users with a wireless hand-held device that interfaces with the WIN-T network and the Global Information Grid (GIG) over terrestrial, airborne, and military and commercial satellite links in order to exchange multimedia information between users.

(b) WIN-T will provide both secure and nonsecure wireline voice telephones.

b. Aerial Communications Node (ACN). The ACN mounted on a high-altitude endurance unmanned aerial vehicle (HAE-UAV) will provide required support and interconnect a JTF, ARFOR, corps, or division that has both legacy and state-of-the-art communications systems. It will provide C3 for CNR, ACUS, DOD data distribution communications systems (DDCS), and cellular phone. The ACN will incorporate a modular communication node payload including a robust antenna and power suite on the airframe to facilitate rapid reconfiguration of the ACN in the HAE-UAV platforms and integrate advanced technology, as they become available. See Figure B-A-B-6.

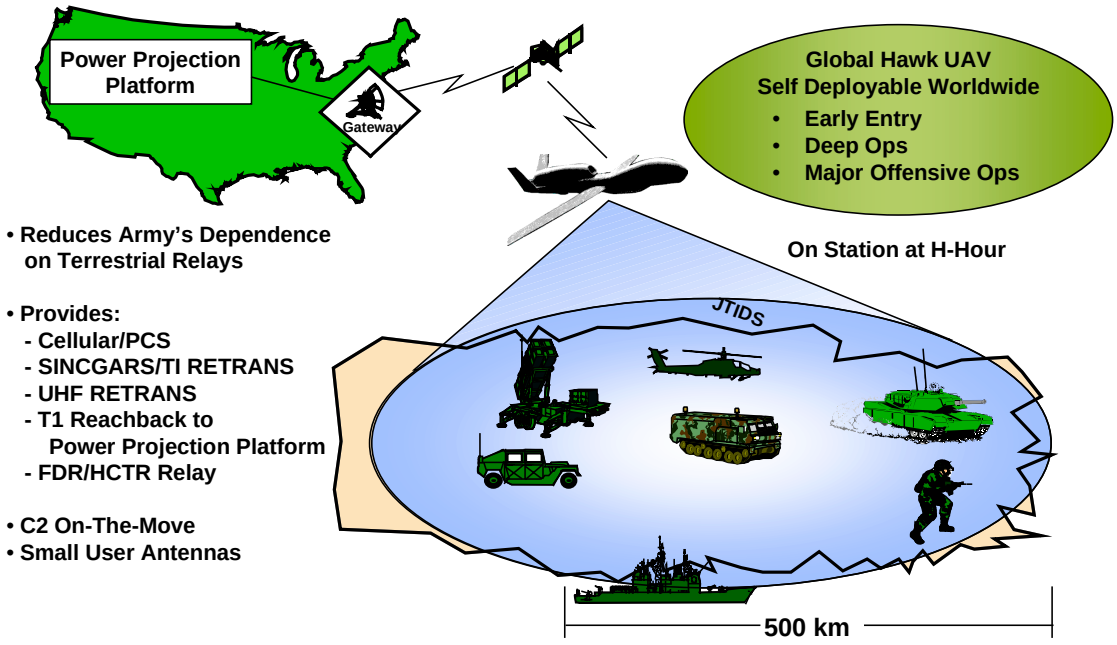

Figure B-A-B-6. Aerial Communications Node

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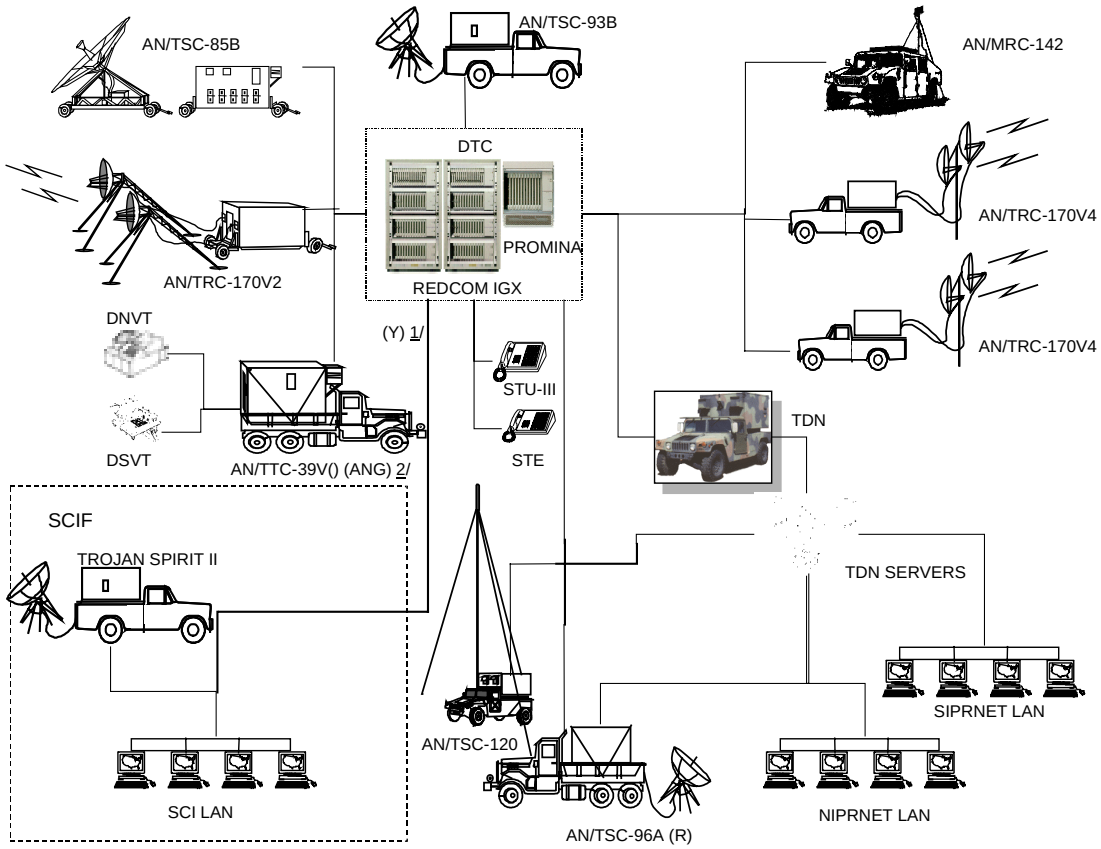
ANNEX C TO APPENDIX TO ENCLOSURE B

MARINE CORPS TACTICAL COMMUNICATIONS ARCHITECTURE

1. Introduction. This annex provides a capsule description of the Marine Corps tactical communications program as planned for in the near and mid terms. A notional near-term MARFOR headquarters is shown in Figure B-A-C-1.



1/ Y traffic is tunneled through the SIPRNET via an encryption device into the SCIF

2/ An AN/TTC-42 may also be present, depending upon the mission

Figure B-A-C-1. Notional Near-Term MARFOR Headquarters

2. Near Term (2000 to 2002)

a. Voice. In the near term, the Marine Corps is fielding the AN/TSQ-XXX digital technical control (DTC) facility that will be deployed at major subordinate command (MSC) level communications nodes. As a transition (to COTS) architecture voice switching node, the DTC will provide direct commercial service interfaces as well as legacy TRI-TAC interfaces. Commercial interfaces that are provided include ISDN primary rate interfaces (PRIs) and basic rate interfaces (BRIs) as well as standard commercial SS7 interfaces. TRI-TAC interfaces are consistent with the common baseline circuit switch (CBCS) software capable family of switches. The DTC provides a variety of connections, signal conversions, cross connects, and interfaces that can be achieved simultaneously. Fielding is expected to begin in January 2001. A total of 30 DTCs are expected to be fielded.

(1) For technical control, the DTC will employ true time GPS, manual patch and test, conditioning equipment, test equipment, and signal entry panels (SEPs) for loop, coaxial cable, fiber and T1 interfaces.

(2) For circuit switching, the DTC will be equipped with a compact digital switch (CDS) (CBCS) with single row Nest (SRN) and a COTS ISDN switch (REDCOM IGX-C).

(3) Multiplexers and modems to be used in the DTC include a Promina 800, AN/FCC-100(V)9, MRVC cards, CV-2048M, MD-1272, and PairGain CSU/DSU.

(4) TRANSEC/COMSEC will be performed by KIV-19s, KIV-7HSs, KGX-93s, KG-82s, and KY-57s.

b. Record Traffic. The AN/MSC-63A has been replaced by the AN/TSC-96 messaging system, with distribution of messages via Microsoft Outlook public folders on the SIPRNET.

c. Dedicated/Special Purpose Traffic. The Marine Corps is fielding the tactical data network (TDN) system. It is being provided as the initial host for the DMS application suite. The system consists of vehicular mounted “gateways” to provide ITSDN WAN connectivity and “servers” to

support LAN connectivity for data switching. The functions and services to be performed by the TDN include data transfer services (IP routing, external network access, and subscriber access), network management (configuration, fault, performance, and security management), and value added services (directory services, message handling, file sharing, and terminal emulation). The TDN is not an AN/MSC-63 replacement. Fielding is expected to begin in January 2001, and a total of 31 TDN gateways and 447 TDN servers are expected to be fielded.

(1) Data transfer services will be done by a Cisco router and Cisco switch, with manual patch and test, test equipment, and SEPs.

(2) Network management will be done by HP Openview and Cisco Works 2000, employing SNMP.

(3) The multiplexing and modem function will be similar to the DTC.

(4) TRANSEC/COMSEC will also be similar to the DTC, using KIV-19s, and KIV-7HSs, but then employing KY-68s, STEs, and KG-175 TACLANE.

d. First-In Capability. The Joint Enhanced Core Communications System (JECCS) will provide a first-in capability for the JTF enabler's "backbone" connectivity requirement to DISN services. The system is housed in an S-788 shelter mounted in an HHV. System capabilities and functions include SIPRNET, NIPRNET, DMS, VTC, UHF TACSAT, GBS, and INMARSAT. The system is designed to augment current and planned communications architectures. As the primary connectivity node for the JTF enabler, the JECCS will facilitate seamless transition to larger communications systems (e.g. DTC and TDN) to support larger follow-on forces.

3. Mid Term (2002-2005)

a. Voice. Commercial ISDN voice switching capability is to be acquired as a result of change 3 to the Joint Unit Level Switching ORD. This enhancement, called the transition switch module (TSM) is designed to be implemented as a replacement for the currently fielded unit level

circuit switch (ULCS) family of equipment (AN/TTC-42, SB-3865). The TSM will include a commercial ISDN voice switching capability that is interoperable with the REDCOM switch in the DTC. Two TSMs will replace each AN/TTC-42, and there will be a one-for-one replacement for each SB-3865. Total replacement and removal of the Marine Corps TRI-TAC voice switching will coincide with the Army's replacement of the currently fielded MSE family of equipment (approximately 2016).

b. Record Traffic. In the mid term, there will be no changes in the Marine Corps record traffic architecture.

c. Data Traffic. Mid-term data traffic improvement to the TDN system is dependent on commercial availability of technology enhancements.

ANNEX D TO APPENDIX TO ENCLOSURE B

NAVY TACTICAL COMMUNICATIONS ARCHITECTURE

1. Navy Tactical Communications Architecture (TCA). The Department of the Navy enterprise-wide network capability provides end-to-end secure, assured access to the full range of voice, video, and data services. This end-to-end capability consists of base area networks, metropolitan area networks, wide area networks, network operations centers, and deployed tactical mobile units. The combined capabilities of these components will support a Marine Expeditionary Unit (MEU) or embarked JTF. NIPRNET and SIPRNET are the standard information exchange mediums for embarked commands and commanders. The Navy tactical architecture is rapidly transitioning to IP services supporting near real-time information transfer via the fleet Network Operations Centers (NOCs) and the GIG.

2. Naval Communications. Naval communications is composed of the Naval Computer and Telecommunications System (NCTS), naval tactical data links, and the Marine Corps communications.

a. NCTS includes three NCTAMS, other supporting shore communications facilities, and management of worldwide communications assets. A NCTAMS is a gateway between the shore (fixed) communications infrastructure and tactical (ship and USMC) communications systems. STEP is a Joint Staff-directed upgrade to the DSCS program to improve and standardize tactical warfighter access to strategic DISN networks and services. In addition, each NCTAMS (Teleport) or supporting facility provides gateway services into the DISN to and from deployed forces. These gateways provide multiplexing and baseband translation as well as cross banding between various space segments.

b. ADNS provides an IP backbone via RF to gateways that connect shipboard tactical networks to shore networks via the Fleet NOCs. ADNS with future upgrades will permit the transition from "stovepipe" systems to standards-based open networks shown in Figure B-A-D-1 (TRI-TAC, plain old telephone system (POTS), N-ISDN, NIPRNET, and SIPRNET).

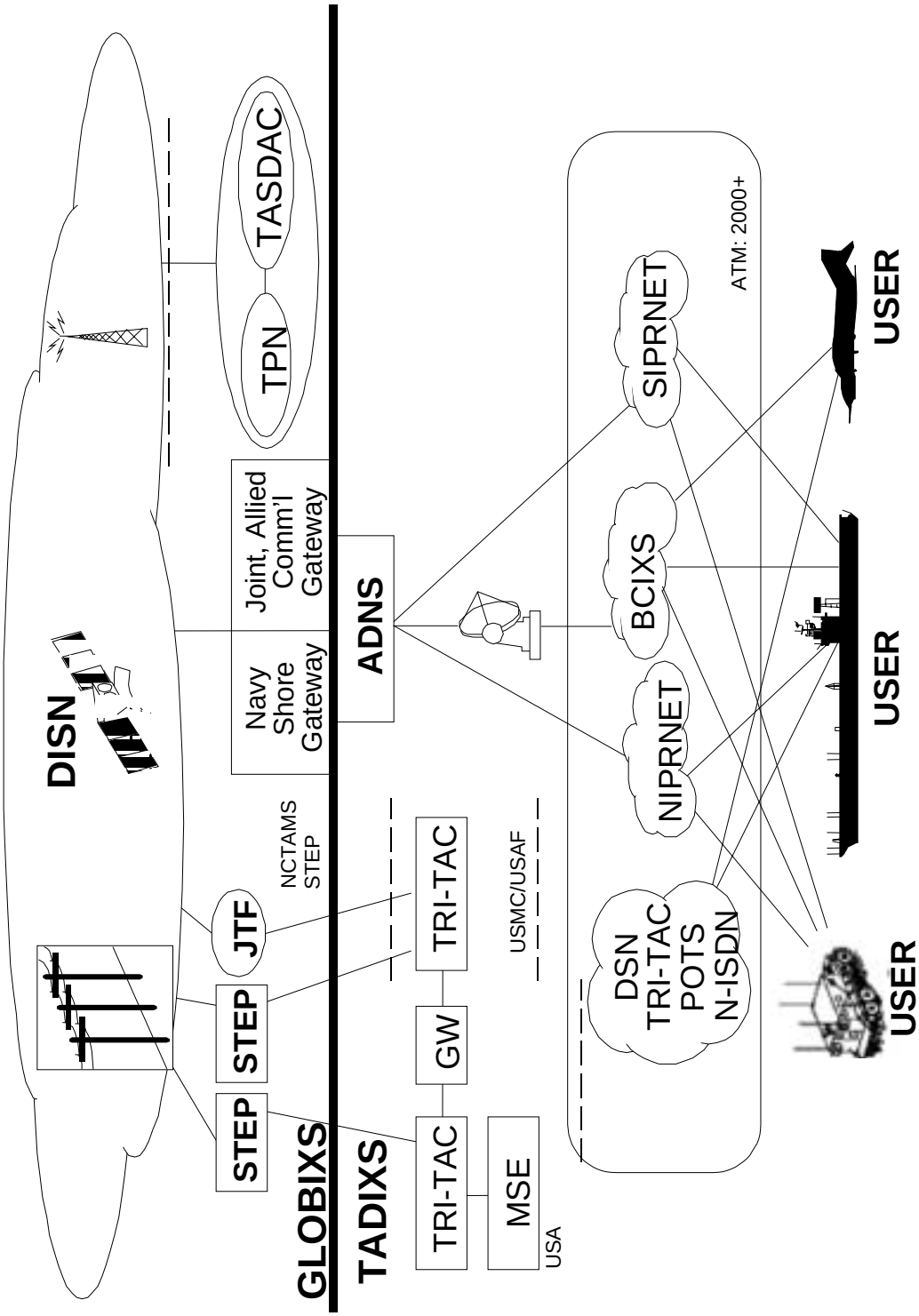


Figure B-A-D-1. Naval Tactical Communications Architecture

These networks will evolve into an ATM network. See CJCSM 6231.07B for more information about ADNS.

c. In terms of transmission systems, the Navy is installing modern MILSATCOM and commercial terminals on ships and at all applicable shore-based support/interface installations. This installation will provide increased efficiency in UHF SATCOM operations because of DAMA technology, enable use of the MILSTAR capabilities and, for selected ships, provide SHF capability. Additionally, commercial terminals are installed to augment MILSATCOM with additional required bandwidth capacity and throughput.

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ANNEX E TO APPENDIX TO ENCLOSURE B

JOINT COMMUNICATIONS SUPPORT ELEMENT TACTICAL ARCHITECTURE

1. Introduction. This annex describes the present modernization strategy to achieve the objective TCA. It documents the current fielding strategy for FY 2000 through FY 2007. All equipment is for joint use and follows the Executive Agent for Theater Joint Tactical Networks (EA-TJTN) process for inclusion into the joint doctrine and architecture.

2. Transmission Systems. The objective architecture for transmissions systems will be a diverse combination of radio systems. UHF DAMA technology will provide increased UHF access to the JTF and JSOTF commanders and components by making more efficient use of the available bandwidth. C and K_u bands will be added to the current military X-band SHF satellite configuration to achieve a tri-band capability. The use of commercial SHF frequency bands provides a supplemental capacity for general purpose communications. In addition, EHF LDR and MDR (MILSTAR and UFO) equipment will be used at the JTF and JSOTF headquarters to provide a robust transmission capability in a hostile electronic environment. GBS equipment will be fielded to provide a high-speed, one-way flow of high-volume information.

a. UHF Systems. The current single channel non-DAMA systems will be replaced with LST-5D and AN/PSC-5 systems that are DAMA capable. The replacement will allow better utilization of the limited UHF resources. These systems will be integrated into transit cases; however, some systems (AN/PSC-5s) will have the capability to be man-portable.

(1) JTF Support. The JTF/TAC-CP radio suites will be configured with three online LST-5Ds and amplifiers and one spare LST-5D and amplifier. In addition, an audio monitoring system (AMS) connected to the radio by fiber optics will be included. The AMS will allow personnel to monitor multiple nets from one position. Although there is no data requirement, there will be a data capability usable on any of the nets being supported. Because the TAC-CP is an extension of the JTF, it will be configured the same as the JTF suite.

(2) Contingency Packages. The contingency package will consist of four AN/PSC-5s and four spares. This package will have data, fax, and voice capabilities. They can be used on any net and are configurable for missions that require man-portable radios.

(3) JTF Extension Sites. The four JTF extension sites packages will consist of one LST-5D, amplifier, and spares. The package will have data, fax, and voice capability and will support sites on an as-needed basis.

(4) JSOTF Support. The JSOTF radio suite will consist of five online LST-5Ds with amplifiers, one spare radio and amplifier, and an AMS remote monitoring system. Included in this package will be data, fax, and voice capability.

(5) JSOTF Extension Sites. The four JSOTF extension sites will each have an AN/PSC-5, spare radio, and data, fax, and voice capability.

(6) JCSE Forward C^2 Package. The JCSE C^2 package will consist of an AN/PSC-5 and a spare. The systems, one for each for the JTFs and JSOTFs, will have data, fax, and voice capability. These systems will also be used for en route communications to the forward area.

(7) JCSE Network Operations Center. The JNOC will have two radios to communicate with the squadrons while en route. Once JCSE units are deployed, the radios will be used to help monitor the status of the JCSE mission.

b. SHF Systems. The AN/TSC-85B and AN/TSC-93B GMF systems were scheduled to be turned in during FY 2000. These systems will be replaced with a mixture of tri-band systems, government and commercial, in both nodal and nonnodal configurations. The future configuration is depicted in Figure B-A-E-1. These systems will continue to use DISN STEP sites as well as commercial SHF bands. There are plans to upgrade STEP sites to accommodate multiple bands or frequencies to satisfy increased bandwidth demands.

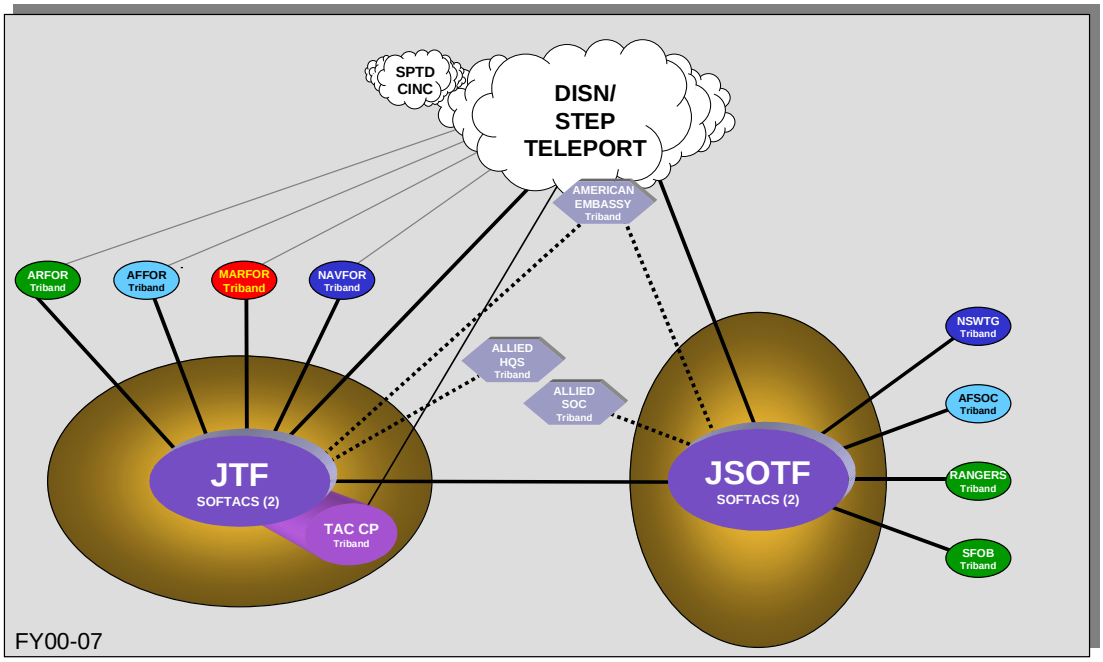


Figure B-A-E-1. Future SHF SATCOM Architecture

c. EHF Satellite Systems. The JCSE will acquire a survivable EHF capability. Initially, each squadron will have the LDR systems to be used for national command messages. The MDR terminals will eventually be acquired to extend secure communications to the JTF/JSOTF commanders. Figure B-A-E-2 shows a typical employment of the EHF system.

(1) Low Data Rate EHF. LDR EHF is defined by transmit bandwidths up to 2.4 Kbps. JCSE will deploy eight MILSTAR SCAMP systems.

(2) Medium Data Rate EHF. MDR EHF is defined by transmit bandwidths up to T-1 (1.544 Mbps). Presently, JCSE is planning to deploy four SMART-T terminals.

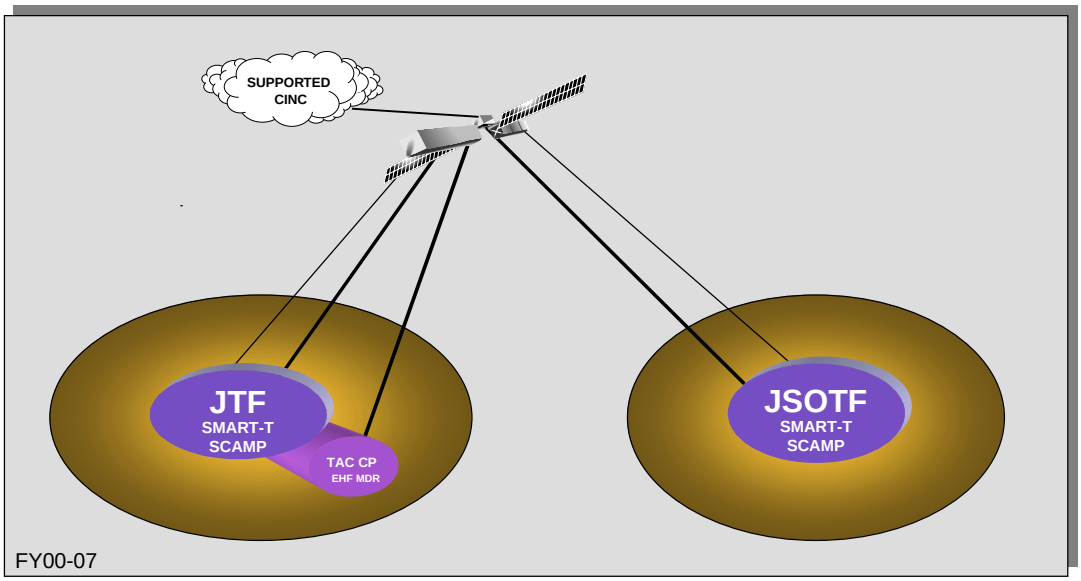


Figure B-A-E-2. Future EHF Satellite Architecture

d. Troposcatter Satellite Support Radio (TSSR). The TSSR system will be used to remote emitters from the JTF and JSOTF headquarters and to provide flexibility for missions in urban and rough terrain areas. Each system will require increased bandwidth, over present systems, to support higher transmission rates.

e. Global Broadcast System. GBS is a large-volume information broadcast system that will augment other satellite communications. GBS will provide the warfighter with a worldwide, high-throughput, broadcast information service. The basic capability will provide a high data rate bit stream of video, data, imagery, and other information from high-powered broadcast satellites to numerous platforms. JCSE will also have a theater injection point (TIP) capability to broadcast information. Received broadcast information will be disseminated via the TACLAN/WAN.

3. Switching Systems. It is envisioned that circuit, message, data, and video switching systems will merge into a multimedia switch using ISDN technology, both broadband ISDN (B-ISDN) and N-ISDN. As with other

systems, each COTS switch will be integrated into transit cases, adding modularity and transportability.

a. Circuit Switch Systems. The JCSE will retire legacy AN/TTC-39A(V)3 and AN/TTC-39A(V)4 TRI-TAC switches as part of the transition into a COTS solution. To satisfy user requirements during the transition to the objective architecture, JCSE will use a combination of on-hand assets supplemented by ISDN capable switches. Figure B-A-E-3 shows the future circuit switch architecture.

(1) Transit Cased Circuit Switch. JCSE will field a hybrid system, the TCCS. This system will consist of a CDS and an ISDN interoperable, commercial PBX. The CDS will provide connectivity to TRI-TAC and MSE equipment as well as to the PBX. The scaleable PBX will provide ISDN functionality and connectivity as well as an interface to the CDS. JCSE will use CDSs that were procured for another program and integrate them with the commercial PBX. Also, the CDSs from another system, the AN/TSQ-188, will be removed, reconfigured, and integrated into transit cases, along with a PBX, to become TCCSs as well. These systems will ensure connectivity to currently fielded systems as well as move forward in technology. As the other services field COTS switches, the JCSE will retire the TCCS and employ strictly commercial PBXs over a high-speed backbone.

(2) RED Switches. The RED switches will be upgraded to the latest technology, hardware, and software, when required. This switching capability will also be added to the Joint Communications Support Squadrons in support of the JSOTF mission.

b. Message Switch Systems. Compliance with the DMS is the objective architecture. The transition to DMS will be accomplished by upgrading the capabilities of the AN/TYQ-63A system and by adding the MSGS. Figure B-A-E-4 shows the architecture.

(1) AN/TYQ-63A. The present system, AN/TYQ-63, will be upgraded with new hardware and software to become the AN/TYQ-63A communications support processor (CSP). It will be an R/Y community switch with a 32-port capacity. As the CSPs are certified and accredited, the AN/TYC-39As will be turned in.

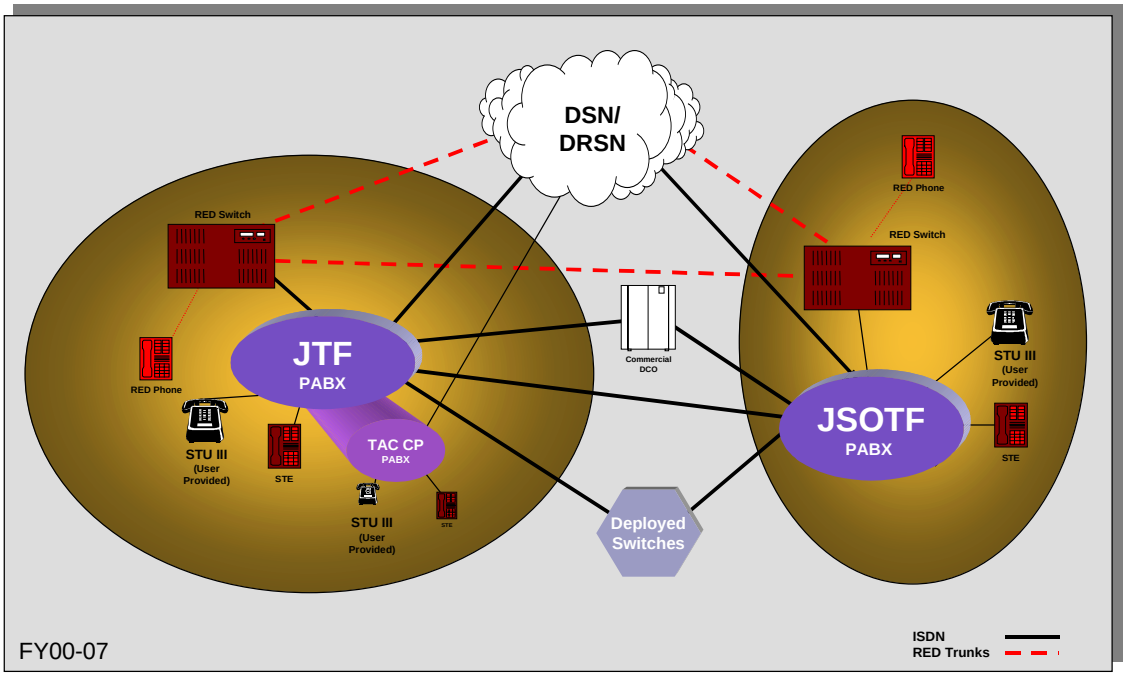


Figure B-A-E-3. Future Circuit Switch Architecture

(2) Multifunction Secure Gateways System (MSGS). The MSGS is a hardware and software solution that adds a message switching capability to the JSOTF. The present configuration is an eight-port system that is certified for GENSER community traffic. These systems will be upgraded to 16-port, R/Y community switches. They will also be interoperable with DMS.

c. Data Network Systems. The current TACLAN/WAN configurations are programmed to be continuously upgraded to leverage technological advances against larger requirements. New equipment and software will be required to process higher data rates. These rates will be required to process voice and video over Internet Protocol systems. The GCCS and JWICS/JMICS systems will also be upgraded as technology improves.

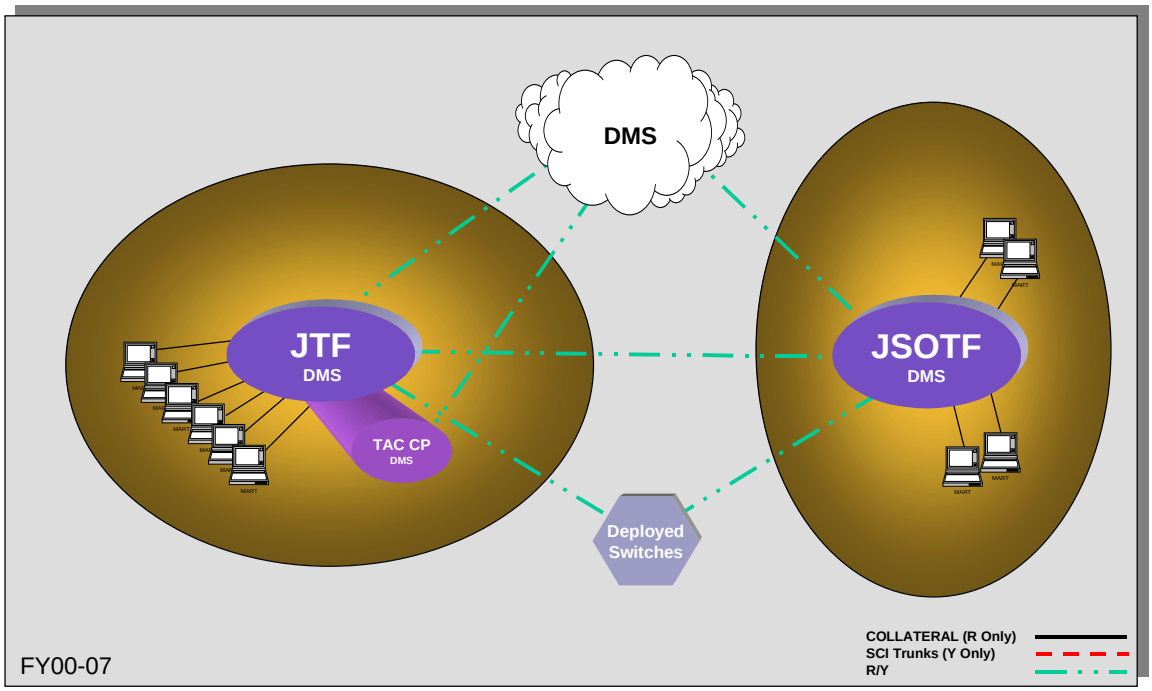


Figure B-A-E-4. Future Message Switch Architecture

d. Video Switch Systems. The JCSE videoconference capability will be a seamless, multiple-standard gateway that will allow any user with VTC capability to initiate or join a videoconference with any other VTC subscriber. This capability includes interfaces for LAN-based video, Internet video, and video over an ATM backbone. It will be accomplished through the use of an International Telecommunications Union – Telecommunications Sector (ITU-T) Recommendation H.320 compliant multipoint control unit (MCU). The JCSE will implement this architecture in stages. The JCSE will initially have this capability using serial interfaces. A variety of interfaces, including serial and dial-up will be available once the commercial PBX switches are fielded. The MCUs have the added capability to provide ITU-T Recommendation T.120 compliant multipoint data sharing (whiteboarding) and audio conferencing for participants without a VTC system. Figure B-A-E-5 shows the intended architecture for the JCSE.

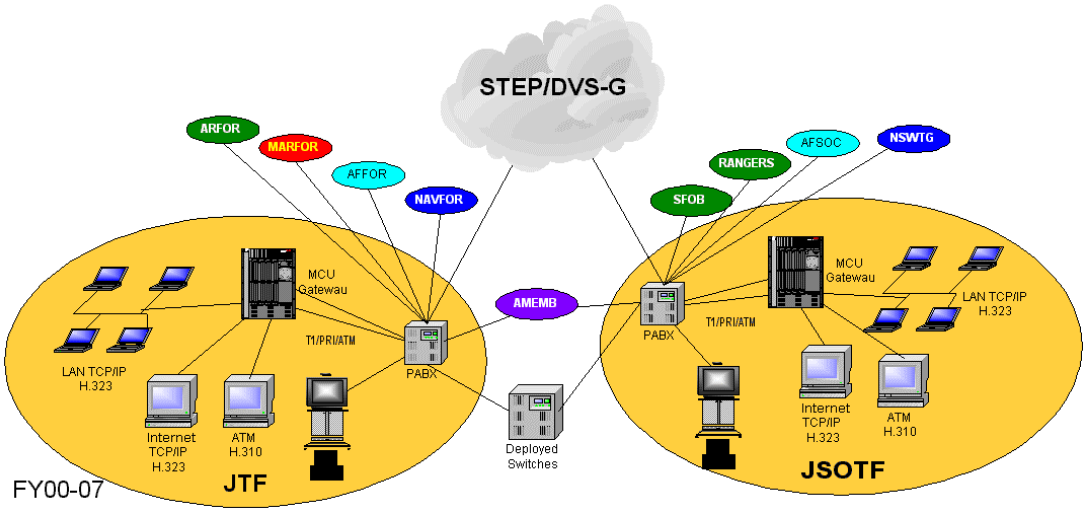


Figure B-A-E-5. Future Multistandard Video Switch Architecture

4. Network Control. Network control systems are at the heart of any communications system. These diverse systems are used for technical control plus bandwidth and network management. Current systems are a combination of legacy TRI-TAC equipment, patch panels, and some of the latest statistical multiplexers.

a. Technical Control. The transit cased technical control (TCTC) is the downsized technical control used by JCSE. It is a COTS-based system that provides backward interoperability to TRI-TAC systems. It is composed of a variety of patch panels and test equipment to aid in circuit troubleshooting and maintenance. A GPS timing subsystem to provide network timing is an integral part of the system. A diagram of he network control function is shown in Figure B-A-E-6.

b. Bandwidth Management. Currently, the JCSE employs the Promina, a statistical multiplexer, to manage bandwidth. More systems will be added to support the extension sites. They will be upgraded to maintain viability and ensure Year 2000 compliance. ATM switches will eventually form the backbone for the DISN, both the tactical and the

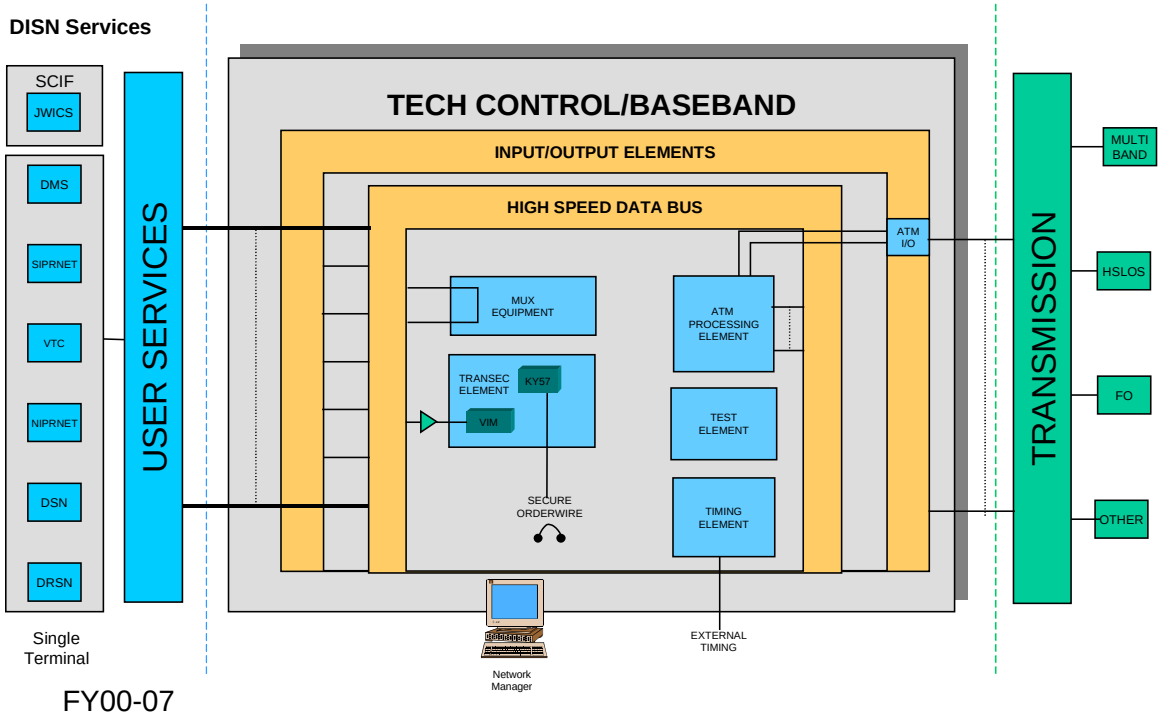


Figure B-A-E-6. Network Control Function

strategic segments. The JCSE will migrate to the B-ISDN architecture as policy and standards solidify.

c. Network Management. Network management becomes more important as the speed, capacity, and complexity of networks increase. This program will be updated as needed to maintain viability. The JNMS is the objective network management architecture to aid JCSE in maintaining very high reliability of the systems. JCSE will eventually deploy a network control center that will consolidate all management functions into a deployable package.

5. User Access

a. Voice. Voice instrument access is proposed to provide local wireless, worldwide personal communications services (PCS), and wireline telephones to the user. Wireline access will be provided by both

secure and nonsecure devices. The DSVTs and DNVTs will be replaced by secure terminal equipment (STEs) and commercial nonsecure instruments. JCSE expects to provide wireless telephones and wireless connections for user's computers in support of mobility and contingency purposes, but also expects to provide the wireline (twisted wire, coaxial, and fiber optic) connection to those devices (telephones and computer LANs) that the users normally bring themselves.

b. Video. JCSE will provide common user VTC and CNN to the user. JCSE will add a desktop VTC capability to the current studio VTC capability. These systems will be upgraded as needed to interface with new technologies.

ENCLOSURE C

JOINT COMMUNICATIONS MANAGEMENT

1. General. Modern tactical operations require highly sophisticated communications systems. These systems must provide rapid, secure, and reliable voice, data, and message communications services throughout the joint operations area (JOA). To provide the required services, joint and Service communications units are equipped with advanced jam-resistant radios, solid-state processor-controlled automatic switching equipment, and digital transmission systems. These systems are integrated into complex tactical networks that meet today's stringent operational requirements. In-depth communications management and careful integration of these systems must be achieved at every level. Successful system integration requires that strict technical and management standards be imposed on these networks.

a. Joint communications management provides centralized control with decentralized execution. It exercises dynamic technical control over theater communications systems and coordinates their interfaces with the Defense Information Infrastructure (DII) or DISN and other combatant command communications systems.

b. The combatant command or JTF J-6 directorate or equivalent office (depending upon the phase of deployment) is responsible for joint communications management. It manages all joint communications (defined as circuits, systems, procedures, facilities, services, and equipment) that:

(1) Support the CINC or CJTF and their operations facilities. The unified command J-6 maintains management of communications that extend from the CINC's headquarters to the deployed location of the JTF.

(2) Support other joint commands in the JOA.

(3) Interface with the components of joint commands.

(4) Provide connectivity to the DII, commercial communications systems, or allied communications systems.

(5) Provide connectivity to the C4 systems of other combatant commands.

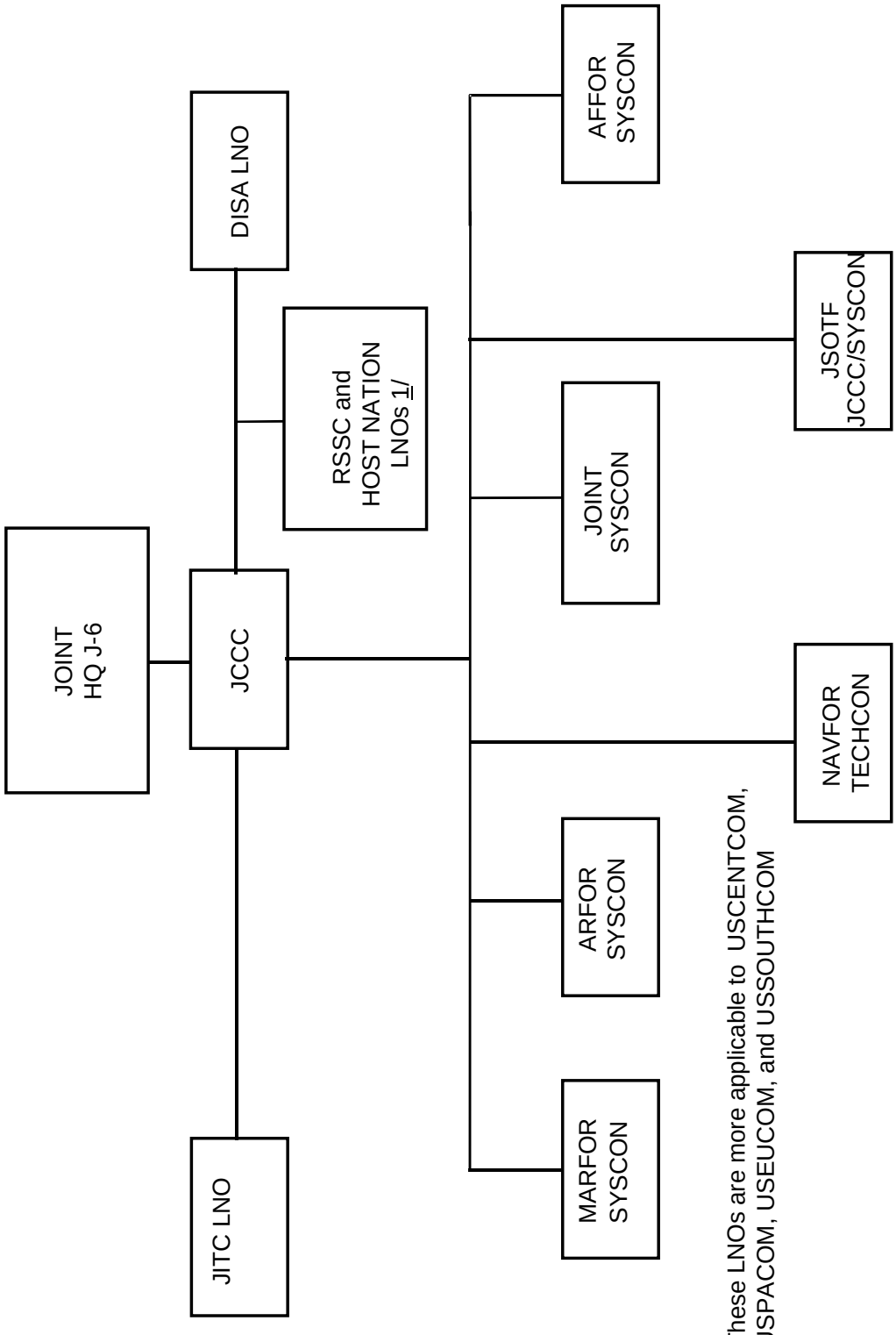
c. Components and the assigned joint communications support organization designate a single office within their communications staff agencies to coordinate and work directly with the combatant command or JTF or JSOTF J-6 directorate throughout the predeployment, deployment, employment, and redeployment phases of the operation or exercise. A CINC JCCC or CINC J-6 coordination group (a "JCCC Rear") may be established at some point during the predeployment phase to perform joint communications management functions until enough people have deployed to run the JCCC in theater. These functions will be transferred to the JTF and/or JSOTF JCCC during the predeployment and deployment phases and will return to the J-6 coordination group during the redeployment phase.

2. Deployed Joint Communications Management Structure. A JCCC is established within the JTF J-6 to manage tactical communications systems deployed in support of joint operations and exercises. Service components and subordinate joint commanders must also establish C4 control centers to serve as single points of responsibility for joint C4 matters. The JCCC exercises staff supervision over C4 control centers belonging to deployed components and subordinate commands. Army, Air Force, Marine, and JSOTF component communications control centers are normally referred to as systems controls (SYSCONs), and the JSOTF may utilize a JCCC/SYSCON that is subordinate to the JTF JCCC. The Navy refers to this management facility as technical control (TECHCON). Figure C-1 depicts a normal joint communications support structure.

3. JCCC. A generic JCCC organization is shown in Figure C-2. Typical responsibilities of each element are described in subparagraphs 3a through 3f. Additional discussion of the JCCC organization can be found in Enclosure B, CJCSM 6231.07B. (Note: The organizational structure of the JCCC described below may not be applicable in all cases. For this reason, the JCCC discussion should be viewed as a functional rather than organizational breakdown.)

a. Current Operations Branch

(1) Serves as JCCC liaison to the Joint Operations Center (JOC).



1/ These LNOs are more applicable to USCENTCOM, USPACOM, USEUCOM, and USSOUTHCOM

Figure C-1. Joint Communications Support

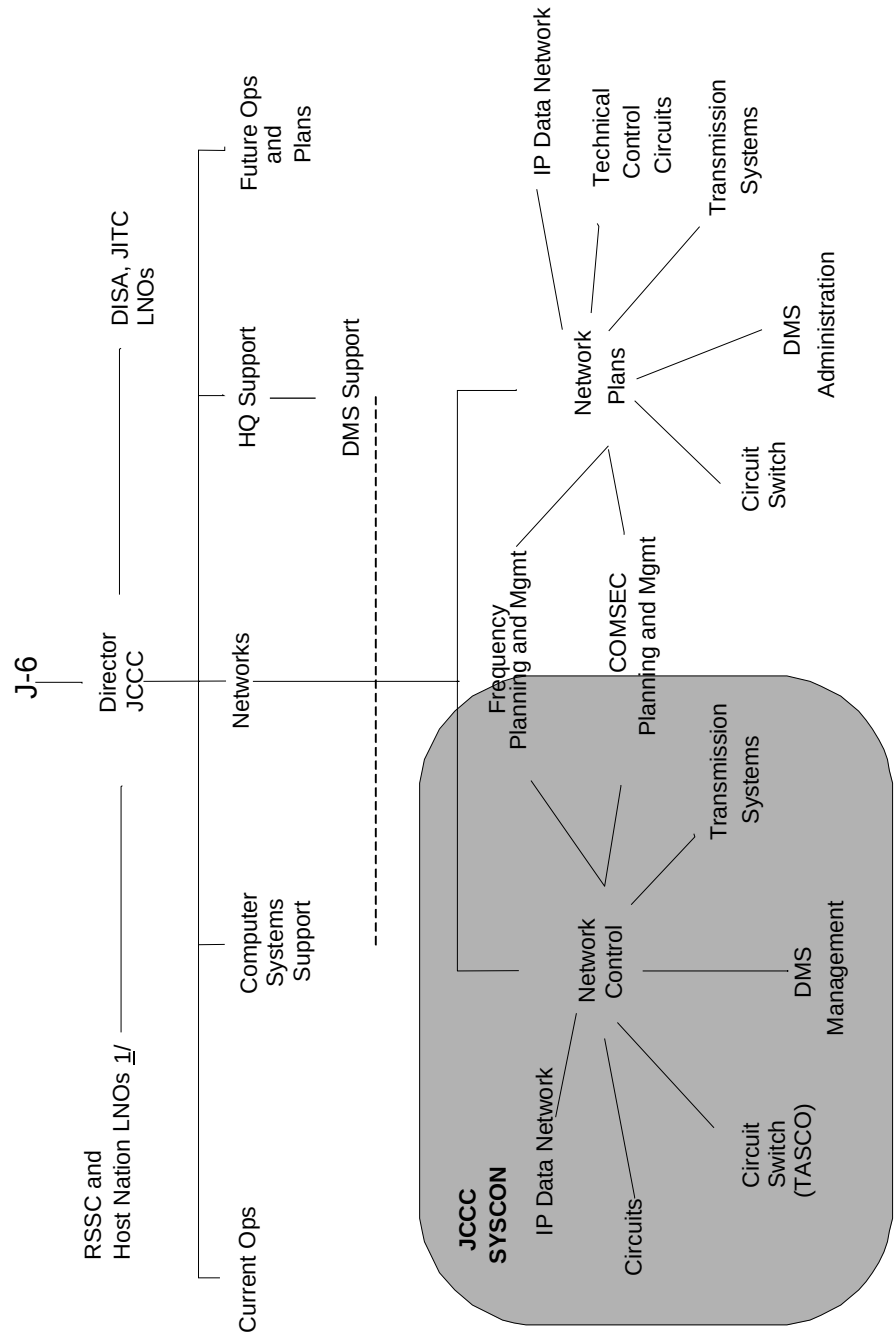


Figure C-2. Generic JCCC Organization

1/ Applicable to USCENTCOM, USEUCOM, USPACOM, and USSOUTHCOM

(2) Advises operational planners on current communications status and provides estimates supporting tactical operations.

(3) Monitors the current status of designated joint systems and circuits and coordinates and deconflicts scheduled communications outages with the JOC director.

(4) Advises other JCCC branches on current tactical situations.

(5) Maintains liaison with appropriate US command elements, allied HQ, commercial organizations, and host-nation communications agencies.

b. Computer System Support Branch

(1) Manages ADP support provided to the JTF.

(2) Coordinates computer support requirements for the JTF.

(3) Plans and coordinates SIPRNET and NIPRNET connectivity for the JTF and components.

(4) Coordinates and monitors the GCCS connectivity to the joint HQ and components.

(5) Interfaces JTF and component ADP systems.

(6) Coordinates with the JTF J-3 Information Operations Officer (IO-O) to ensure that information assurance tools for the JTF are available.

c. Networks Branch

(1) Manages and controls joint communications circuits and systems.

(2) Plans, engineers, and coordinates joint communications systems, satellite accesses, networks, and circuits.

(3) Identifies problems with communications systems and circuits and takes appropriate action for system restoral, reconstruction, or

alternate routing. Keeps the Current Operations Branch informed of any significant changes to the network for reporting purposes.

(4) Manages, plans, allocates, and deconflicts usage of all theater frequencies.

(5) Manages the use of COMSEC assets and monitors the employment of procedures used with those assets.

(6) Requests interfaces with the DII and communications systems of allied commands, other US commands, and US and allied commercial organizations and coordinates their establishment.

(7) Controls, manages, and supervises the tactical packet switch systems for the JTF and JCSE.

(8) In coordination with the JTF J-3 IO-O ensures that information assurance tools are active to provide monitoring and reporting of the JTF information assurance posture as required by CJCSI 6510.01B and the DOD Information Assurance Vulnerability Alert (IAVA) Policy Memorandum. See Annex C to Appendix A to Enclosure E, CJCSM 6231.07B.

d. Headquarters Support Branch. The Headquarters Support Branch provides all communications support for the HQ, including operation of telecommunications centers, facsimile service, and maintenance and operation of various terminals, radios, and other communications equipment within the HQ.

e. Future Operations and Plans Branch

(1) Supports the JCCC operations element.

(2) Interfaces with joint HQ operational planners and advises them on C4 matters pertaining to future operations.

(3) Coordinates, develops, and prepares the C-E Annex (Annex K) to the plans and orders.

(4) Coordinates those plans and orders with component and allied commands.

f. DISA LNO. The DISA LNO serves as the interface between the JTF J-6 and DISA, including all matters pertaining to the allocation and use of DII resources and interfaces.

g. JITC LNO. The JITC LNO serves as the interface between the JTF J-6 and the JITC for technical expertise in the areas of joint communications transmission systems, voice switching systems, message switching systems, data systems, and other joint communications systems.

h. Other LNOs. In addition to the DISA and JITC LNOs, the RSSC and host nation(s) may be required to provide LNOs.

4. Future Operations (Plans and Orders)

a. The JTF J-6 directorate develops joint C-E plans in accordance with joint HQ guidance. These plans are normally published in the Joint Operation Planning and Execution System (JOPES) (Joint Pub 5-03 series) format as Annex K to an OPLAN, CONPLAN, or exercise directive. Joint communications transmission systems, voice switching systems, message switching systems, facsimile systems, computer systems, data networks, management systems, network timing systems and standards,and dedicated circuits are engineered in depth, and appropriate appendixes to Annex K are developed and published. Component commanders develop supporting C-E plans as an Annex K to their OPLAN, CONPLAN, exercise plan, operations order (OPORD), or exercise directive.

b. After an appropriate OPLAN, CONPLAN, exercise plan, OPORD, or exercise directive has been developed, higher authority may direct its execution. Changes to any of the previously prepared communications planning and engineering data are prepared by the JTF J-6 and published as a telecommunications service order (TSO). After a TSO has been approved, the JCCC passes the information to each subordinate management or control element by any secure means available for immediate execution. The TSO is then confirmed by a narrative (record) message.

5. Reports. C-E elements maintain the current status of key systems, circuits, and C-E facilities and major equipment items that are internal to, served by, and/or serve their respective HQ and subordinate commands. Communications status reporting is accomplished via JCCC

channels and flows from lower to higher HQ. Detailed descriptions of reporting requirements are found in CJCSM 6231.07B.

ENCLOSURE D

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ENCLOSURE E

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7th Signal Brigade
10th Signal Battalion
13th Signal Battalion
11th Signal Brigade
16th Signal Battalion
22nd Signal Brigade
24th Signal Battalion
28th Signal Battalion
29th Signal Battalion
32nd Signal Battalion
35th Signal Brigade
40th Signal Battalion
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156th Signal Battalion
212th Signal Battalion
228th Signal Brigade
230th Signal Battalion
234th Signal Battalion
279th Signal Battalion
280th Signal Battalion
286th Signal Battalion
304th Signal Battalion
307th Signal Battalion
311th Signal Command
311th Signal Command Forward
319th Signal Battalion
324th Signal Battalion
327th Signal Battalion
335th Theatre Signal Command
359th Signal Brigade
369th Signal Battalion
392nd Signal Battalion
414th Signal Company
442nd Signal Battalion
501st Signal Battalion
516th Signal Brigade
711th Signal Battalion
804th Signal Company
1110th Signal Battalion
US Army Forces Command
US Army I Corps
US Army V Corps

US Army Central Command
US Army Communications Electronics Command
US Army Directorate of Information Systems for Command, Control, Communications and Computers
US Army Hi Tech Regional Training Site
US Army Program Manager Military Satellite Communications
US Army Program Manager Warfighter Information Network-Tactical
US Army Signal School
US Army Regional Satellite Support Center-Europe
US Army Signal Command
US Army Pacific
US Army Training and Doctrine Command
US Army Special Operations Command

US Navy

2nd Fleet Commander, N-6
3rd Fleet Commander, N-6
5th Fleet Commander, N6
6th Fleet Commander, N-6
7th Fleet Commander, N-6
Chief of Naval Education and Training
Commander, Amphibious Group 1, N6
Commander, Amphibious Group 2, N6
Commander, Amphibious Group 3, N6
Commander, NAVCOMTELCOM
Commander in Chief Atlantic Fleet, N-6
Commander in Chief Pacific Fleet, N-6
Commander, Naval Air Forces, US Atlantic Fleet, N6
Commander, Naval Air Forces, US Pacific Fleet, N6
Commander in Chief US Navy Europe, London/N-6
Commander in Chief US Navy Europe, Naples/N-6
Commander, Naval Sea Systems Command
Commander, US Naval Forces, Alaska, N6
Commander, US Naval Forces Central, N6
Commander, US Naval Forces, Japan
Commander, US Naval Forces Korea, N6
Commander, Operational Test and Evaluation Force
Commander, Space and Warfare Systems Command
Commanding Officer, Navy Special Warfare Command

Dept of the Navy, CNO, N61, 62, 63, 64
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Naval Communications and Telecommunications Master Station Atlantic
Naval Communications and Telecommunications Master Station Bahrain
Naval Communications and Telecommunications Master Station Guam
Naval Communications and Telecommunications Master Station Eurcent Naples
Naval Communications and Telecommunications Master Station Pacific
Naval Communications and Telecommunications Master Station Puget Sound
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Naval Space Command
Naval Surface Warfare Center
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Naval Surface Forces Pacific Fleet
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Space and Warfare Systems Center
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USS BATAAN, LHD-5, Communications Officer
USS BELLEAU-WOOD, LH-3
USS BLUE RIDGE, LCC-19
USS BONNE HOMME RICHARD, LHD-6
USS BOXER, LHD-4
USS CARL VINSON, CVN-70
USS CONSTELLATION, CV-64
USS CORONADO, AGF-11
USS DWIGHT D. EISENHOWER, CVN-69
USS ENTERPRISE, CVN-65
USS ESSEX, LHD-2
USS GEORGE WASHINGTON, CVN-73
USS HARRY S. TRUMAN, CVN-75
USS JOHN F. KENNEDY, CV-67
USS JOHN C. STENNIS, CVN-74

USS KEARSARGE, LHD-3
USS KITTY HAWK, CV-63
USS LA SALLE, AGF-3
USS MOUNT WHITNEY, LCC-20
USS NASSAU, LHA-4
USS NIMITZ, CVN-68
USS PELELIU, LHA-5
USS SAIPAN, LHA-2
USS TARAWA, LHA-1
USS THEODORE ROOSEVELT, CVN-71
USS WASP, LHD-1

US Air Force

1st Combat Communications Squadron
1st Communications Squadron
2nd Communications Squadron
3rd Communications Squadron
3rd Combat Communications Group
4th Communications Squadron
4th Air Support Operations Group
5th Combat Communications Squadron
8th Air Force
12th Air Force
16th Air Force
18th Communications Squadron
20th Communications Squadron
27th Communications Squadron
28th Communications Squadron
31st Combat Communications Squadron
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52nd Combat Communications Squadron
52nd Communications Squadron
53rd Combat Communications Squadron
94th Combat Communications Squadron

103rd Air Control Squadron
107th Air Control Squadron
109th Air Control Squadron
114th Combat Communications Squadron
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291st Combat Communications Squadron
292nd Combat Communications Squadron
293rd Combat Communications Squadron
319th Communications Squadron
333rd Training Squadron
338th Training Squadron
347th Communications Squadron
349th Communications Squadron
352nd Operations Support Squadron
354th Communications Squadron
355th Communications Squadron
366th Communications Squadron
603rd Air Control Squadron
606th Air Control Squadron
607th Air Support Operations Group
607th Combat Communications Squadron
608th Air Communications Squadron
609th Air Communications Squadron
612th Air Communications Squadron
613th Air Communications Squadron
615th Air Mobility Communications Squadron
621st Air Mobility Communications Squadron
682nd Air Support Operations Center
728th Air Communications Squadron
729th Air Communications Squadron
911th Air Lift Wing
914th Combat Communications Squadron
Aerospace Command and Control and Information, Surveillance Reconnaissance Center
Air Force Communications Agency
Air Force Operational Test and Evaluation Command
Air National Guard and Reserve Command
Air Force Space Command

Air Force Special Operations Command
Air Force Electronic Systems Command
Headquarters Air Combat Command
Headquarters US Air Force
Headquarters US Air Force Europe
US Central Command Air Force

US Marine Corps

1st Force Service Support Group
1st Marine Air Wing
1st Marine Division
1 Marine Expeditionary Force
2nd Force Service Support Group
2 Marine Expeditionary Force
2nd Marine Air Wing
2nd Marine Division
3rd Marine Air Wing
3rd Marine Division
3rd Force Service Support Group
3 Marine Expeditionary Force
6th Communications Battalion
6th Marine Regiment
7th Communications Battalion
7th Marine Regiment, Reinforced
8th Communications Battalion
9th Communications Battalion
11th Marine Expeditionary Unit
13th Marine Expeditionary Unit
15th Marine Expeditionary Unit
22nd Marine Expeditionary Unit
24th Marine Expeditionary Unit
26th Marine Expeditionary Unit
31st Marine Expeditionary Unit
Expeditionary Warfare Tactical Group, Atlantic
Expeditionary Warfare Tactical Group, Pacific
Marine Corps Air Ground Command
Marine Corps Combat Development Command
Marine Corps Command and Control Systems School
Marine Corps Communications Electronics School
Marine Corps Detachment, US Army Signal School

Marine Corps Reserve Headquarters
Marine Corps Systems Command
Marine Corps Tactical Systems Support Activity
Marine Corps University
Marine Forces Atlantic
Marine Forces Pacific
Marine Forces Europe
Marine Wing Communications Squadron 18
Marine Wing Communications Squadron 28
Marine Wing Communications Squadron 38
Marine Wing Communications Squadron 48

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Headquarters Special Operations Command South
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Joint Communications Support Element
Executive Agent, Theater Joint Tactical Networks
Joint Battle Center
Joint COMSEC Management Office
Joint Task Force Systems Course Manager
Joint Warfighting Center
The Joint Staff

Defense Agencies

Defense Information Systems Agency
National Security Agency

GLOSSARY

ABBREVIATIONS AND ACRONYMS

AC	alternating current
ACN	aerial communications node
ACUS	Army common user system
ADP	automated data processing
ADNS	automated digital network management
AEF	aerospace expeditionary force
AEW	air expeditionary wing
AFFOR	Air Force forces
AFRTS	Armed Forces Radio and Television Service
AFSOC	Air Force Special Operations Command
AFSOF	Air Force special operations forces
AKDC	automatic key distribution center
AMEMB	American embassy
AMPSSO	Automated Message Processing System Security Office (or Officer)
AMS	audio monitoring system
ANDVT	advanced narrow band secure voice terminal
ARFOR	Army forces
ARSOF	Army special operations forces
ATM	asynchronous transfer mode
ATCCS	Army Tactical Command and Control System
AUTODIN	Automatic Digital Network
AWE	Army warfighter experiment
BAM	basic access module
BCIXS	battlecube information exchange system
BFA	battlefield area
BIP	base information protection
B-ISDN	broadband ISDN
BLOS	beyond line of sight
BRI	basic rate interface
BSM	battlefield spectrum management
BVTC	broadband video teleconferencing
C	commercial SHF frequency band
C2	command and control
C3	command, control, and communications

C4	command, control, communications, and computers
CBCS	common baseline circuit switch
CCG	combat communications group
CDI	conditioned diphase
CDS	compact digital switch
C-E	communications-electronics
CHS	common hardware and software
CIM	crypto interface module
CIO	chief information officer
CINC	commander of a combatant command
CJCS	Chairman of the Joint Chiefs of Staff
CJCSI	Chairman of the Joint Chiefs of Staff Instruction
CJCSM	Chairman of the Joint Chiefs of Staff Manual
CJTF	commander, joint task force
CM	crypto module
CNN	Cable News Network
CNR	combat net radio
COMAFFOR	commander, Air Force forces
COMARFOR	commander, Army forces
COMJSOTF	commander, joint special operations task force
COMNAVFOR	commander, Navy forces
COMMARFOR	commander, Marine forces
COMSEC	communications security
CONEXPLAN	contingency and exercise plan
CONPLAN	contingency plan in concept format
CONUS	continental United States
COTS	commercial-off-the-shelf
CP	command post
C/S/A	CINC/Service/Defense agency
CSP	communications support processor
CSPC	call service position console
CSU/DSU	channel service unit/data service unit
CT	communications terminal
DAMA	demand assigned multiple access
DCO	dial central office
DDCS	data distribution communications system
DGM	digital group multiplexer
DIA	Defense Intelligence Agency
DII	Defense Information Infrastructure

DISA	Defense Information Systems Agency
DISN	Defense Information Systems Network
DLMPA	diphase loop modem A
DMS	Defense Message System
DNS	domain name server
DNVT	digital nonsecure voice terminal
DOD	Department of Defense
DODD	Department of Defense Directive
DSN	Defense Switched Network
DRSN	Defense Red Switch Network
DSCS	Defense Satellite Communications System
DSSCS	Defense Special Security Communications System ("Y" traffic)
DSVT	digital subscriber voice terminal
DTC	digital technical control
DTG	digital transmission group
DVS-G	DISN Video Services-Global
EAC	echelons above corps
EATJTN	Executive Agent for Theater Joint Tactical Networks
EHF	extremely high frequency
EPLRS	enhanced position location and reporting system
ESOP	enhanced switch operations program
ETGMOW	enhanced trunk group module orderwire
FDC	first digital corps
FDD	first digital division
FLTSAT	Fleet Satellite
FO	fiber optic
FY	fiscal year
GAR	gateway access request
GBS	global broadcast system
GCCS	global command and control system
GENSER	general service ("R" traffic)
GIG	Global Information Grid
GLOBIXS	global information exchange system
GMF	Ground Mobile Forces
GNOSC	global network operations and security center
GPS	global positioning system

GTACS	ground tactical air control system
HAE-UAV	high-altitude endurance unmanned aerial vehicle
HCLOS	high capacity line-of-sight
HF	high frequency
HHD	handheld device
HHV	heavy HMMWV
HMMWV	high mobility multipurpose wheeled vehicle
HP	Hewlett Packard
HQ	headquarters
HSFEC	high-speed forward error correction
HSLOS	high-speed line of sight
IAVA	information assurance vulnerability alert
IAW	in accordance with
ICAP	integrated communications access package
ICP	Intertheater COMSEC Package
ID	infantry division
IHFR	interim high-frequency radio
INE	inline network encryptor
INMARSAT	International Maritime Satellite Consortium
I/O	input/output
IOM	installation, operation, and maintenance
IO-O	Information Operations Officer
IP	internet protocol
IPR	internet protocol router
ISDN	integrated services digital network
ISYSCON	integrated systems control
ITSDN	Integrated Tactical-Strategic Data Networking
ITU-T	International Telecommunications Union-Telecommunications Sector
J-6	Command, Control, Communications, and Computer Systems Directorate
JCCC	Joint Communications Control Center
JCEOI	Joint Communications-Electronics Instructions
JCMO	Joint COMSEC Management Office
JCS	Joint Chiefs of Staff
JCSE	Joint Communications Support Element
JECCS	Joint Enhanced Core Communications System

JFC	joint force commander
JIEO	Joint Information and Engineering Organization
JITC	Joint Interoperability Test Command
JKMP	joint key management plan
JMICS	JWICS mobile integrated communications system
JNMS	joint network management system
JNOC	JCSE network operations center
JOA	joint operations area
JOC	joint operations center
JOPES	Joint Operation Planning and Execution System
JSOACC	joint special operations air component commander
JSOTF	joint special operations task force
JSTARS	joint surveillance, target attack radar system
JTA	joint technical architecture
JTC3A	Joint Tactical Command, Control, and Communications Agency
JTCSM	Joint Tactical Communications Systems Manual
JTCSMWG	Joint Tactical Communications Systems Manual Working Group
JTF	joint task force
JTIDS	Joint Tactical Information Distribution System
JTRS	Joint Tactical Radio System
JWG	joint working group
JWICS	Joint Worldwide Intelligence Communications System
K_a	commercial SHF frequency band
Kbps	kilobits per second
KG	key generator
KMP	key management plan
K_u	commercial SHF frequency band
kW	kiloWatt
LAN	local area network
LDR	low data rate
LEN	large extension node
LKG	loop key generator
LL	long local

LM	laser module
LMR	land mobile radio
LMS	lightweight modular shelter
LMST	lightweight multiband satellite terminal
LNO	liaison office
LOS	line-of-sight
LPD	low probability of detection
LPI	low probability of intercept
LTU	line termination unit
LVM	large voice module
MAGTF	Marine Air-Ground Task Force
MARFOR	Marine forces
Mbps	megabits per second
MCU	multifunction control unit
MDR	medium data rate
MEU	Marine Expeditionary Unit
MILSTAR	military strategic tactical relay satellite communications
MJCS	memorandum issued in the name of the Joint Chiefs of Staff
MPM	mission plan management
MSC	major subordinate command
MSE	mobile subscriber equipment
MSGS	multifunctional secure gateway system
MSS	mobile satellite services
NAVFOR	Navy forces
NAVSOF	Navy special operations forces
NCC	network control center
NCS	node center switch
NCTAMS	naval computer and telecommunications master station
NCTS	naval computer and telecommunications system
NES	network encryption system
N-ISDN	narrowband Integrated Switched Digital Network
NIPRNET	Sensitive but Unclassified Internet Protocol Router Network
NMS	network management system
NOC	network operations center
NOSC-D	network operations and security center-deployed

NPE	network planning and engineering
NRZ	nonreturn to zero
NSA	National Security Agency
NSWTG	Naval special warfare task group
OPLAN	operation plan
OPCON	operational control
OPORD	operations order
OPR	office of primary responsibility
ORD	operational requirements document
OTAR	over-the-air rekey
PABX	private automatic branch exchange
PBX	private branch exchange
PCMCIA	Personal Computer Memory Card Interface Association
PCS	personal communications services
PLA	plain language address
PMux	P-Mux module
POTS	plain old telephone system
PRI	primary rate interface
PS	packet Switch
PSN	packet switch network
PSYOP	psychological operations
PTT	postal telephone and telegraph
Pub	publication
QRSA	quick reaction satellite antenna
RASI	remote access subscriber interface
RF	radio frequency
RFM	radio frequency module
RFS	request for service
RHM	RED hub module
RI	routing indicator
RNOSC	regional network operations and security center
RRM	RED router module
RSSC	regional space support center
R/Y	GENSER or SCI
SA	system administration

SAR	satellite access request
SAT	satellite
SBU	sensitive but unclassified
SCAMP	single channel antijam manportable terminal
SCI	sensitive compartmented information
SCIF	sensitive compartmented information facility
SEN	small extension node
SEP	signal entry panel
SFOB	special forces operating base
SHF	super high frequency
SINCGARS	single-channel ground and airborne radio system
SIPRNET	Secret Internet Protocol Router Network
SMART-T	secure mobile antijam reliable tactical terminal
SMTP	simple mail transfer protocol
SMU	switch multiplexer unit
SNMP	simple network management protocol
SOA	special operations aviation
SOC	special operations component
SOCCE	Special Operations Command and Control Elements
SOCFOR	Special Operations Command forces
SOF	special operating forces
SPEED	Systems Planning, Engineering, and Evaluation Device
SRN	single row nest
SSS	single shelter switch
STAMPS	stand-alone message processing system
STAR-T	SHF tri-band advanced range extension tactical terminal
STE	secure terminal equipment
STEP	standardized tactical entry point
STSVT	strategic/tactical secure voice terminal
STUM	STU-IIIR module
SUPP	supplement
SVM	secure voice module
SYSCON	system control
T3(H)	tactical tri-band terminal (HMMWV)
TACLAN/WAN	tactical LAN/WAN
TACSAT	tactical satellite

TADIXS	tactical information exchange system
TASCO	Tactical Automatic Switch Control Officer
TBMCS	Theater Battle Management Core Systems
TCA	tactical communications architecture
TCCC	theater C4 coordination center
TCCS	transit cased circuit switch
TCP/IP	transmission control protocol/internet protocol
TCS	tactical command system
TCTC	transit cased technical control
TDC	theater deployable communications
TDN	tactical data network
TECHCON	technical control
TED	trunk encryption device
TGMOW	transmission group module orderwire
THSDN	tactical high speed data network
TI	tactical internet
TIP	theater injection point
TIU	TSSR interface unit
TMG	tactical multinet gateway
TMS	tactical message switch
TNAPS+	tactical network planning and management system plus
TNS	tactical name server
TOC	tactical operations center
TPA	tactical packet adapter
TPN	tactical packet network
TQG	tactical quiet generator
TRANSEC	transmission security
TRI-TAC	Tri-Service Tactical Communications Program
TROPO	tropospheric scatter
TSC(A)	Theater Signal Command (Army)
TSM	transition switch module
TSO	telecommunications service order
TSSR	tropo satellite support radio
TSWG	technical subworking group
TTA	tactical terminal adapter
TUAV	tactical unmanned aerial vehicle
UFO	ultra high frequency follow-on
UHF	ultra high frequency

ULCS	unit level circuit switch
UPS	uninterruptable power supply
USAF	United States Air Force
USCENTCOM	United States Central Command
USEUCOM	United States European Command
USJFCOM	United States Joint Forces Command
USMC	United States Marine Corps
USPACOM	United States Pacific Command
USSOCOM	United States Special Operations Command
USSOUTHCOM	United States Southern Command
VHF	very high frequency
VIM	versatile backplane bus INFOSEC module
VTC	video teleconferencing
WAN	wide area network
WECO	Western Electric Corporation
WIN-T	warfighter information network-tactical
WX	weather FAX
X	military SHF frequency band